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The OIL WEEKLY

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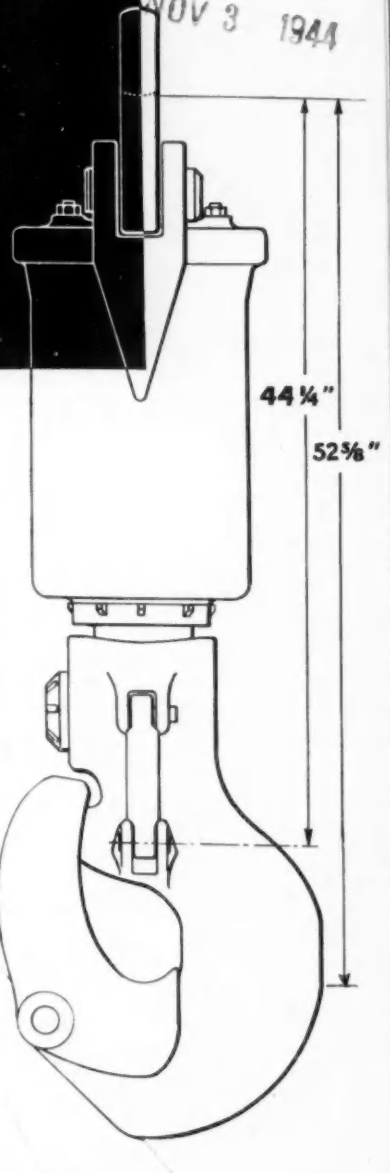
New BJ 460 HOOK



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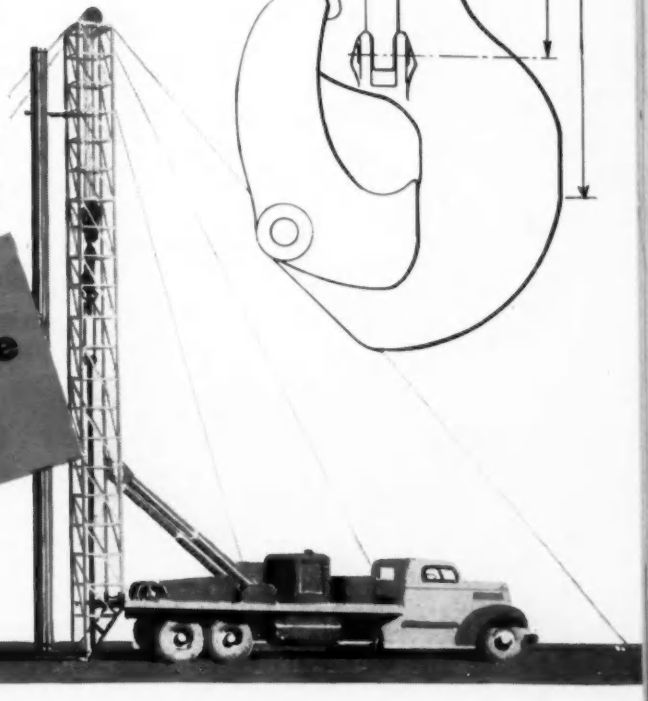

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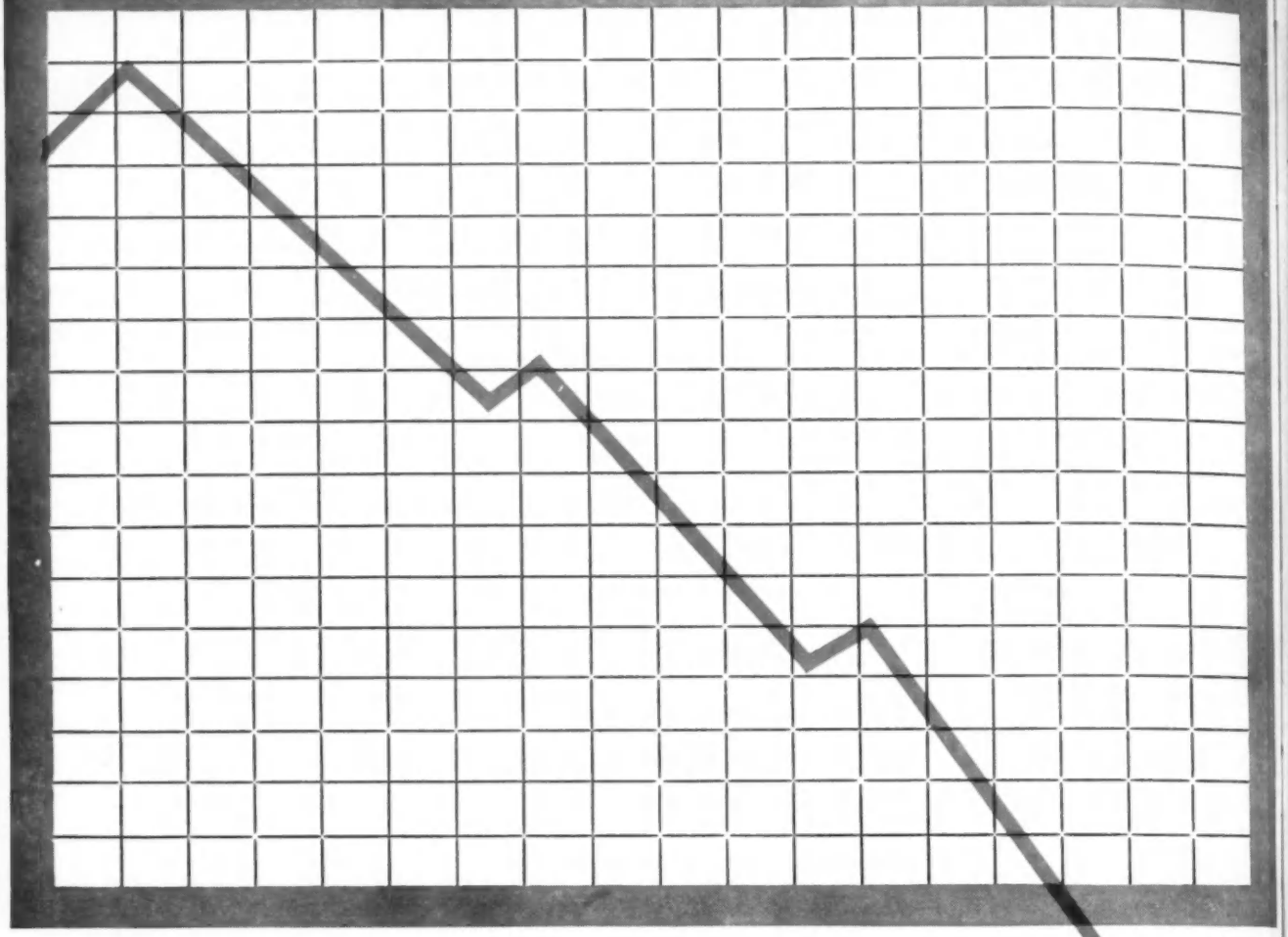

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THE OIL WEEKLY

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LOOKING AHEAD
. . . with the Editor

THE Tennessee Gas & Transmission Company, putting through a natural gas line from the Texas Gulf Coast fields to the area formerly entirely dependent upon the waning gas-producing areas of the East, had a unique opportunity in pipeline planning and construction—and made the most of it.

The new line, now in the final testing stages, embodies more developments and innovations in its construction and operation than any previous trunk-line gas carrier and, unhampered by existing facilities, has been engineered from the start to utilize the most recent developments in pipelining, gas compression, and operation.

Early recognizing the importance of the Tennessee line, THE OIL WEEKLY has had editorial representatives on the line since operations were started, and will present, in the next issue, a complete pictorial survey of the line laying and the modern compressor stations. With the pictures will be engineering articles detailing the design and construction of the modern dehydration plant and the compressor stations, together with technical discussions of the economics underlying the construction of the line and of the corrosion-protection problems and their solutions.

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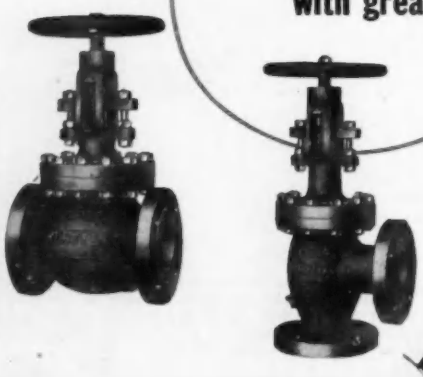

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The Changing Panorama

United Industry Should Lift Voice Against Oil Pact

THE fight which is being made by those connected with the oil industry against ratification of the proposed Anglo-American oil agreement is one that affects not only this one commodity and business but virtually all others in the American scene.

That being the case, other industries and businesses should become concerned NOW and raise their voices along with oil speakers and groups in an effort to make the first round a decisive one against the forces seeking to foist federal and world control over the items that go to make up our way of life. A victory in this, the first stage of the fight, would save much future agonizing by business leaders who, because of preoccupation, may think they are not interested because their particular item right now is not involved. Rest assured, if the oil industry is plastered with the "agreement," then other industries likewise are doomed.

Just about the same thought was expressed recently by John W. White, president of Westinghouse Electric International Company, whose particular point is opposition to the threat of cartels. Legalizing of cartels is just one of the several insidious possibilities shoved at us in the proposed Anglo-American oil pact. There are many others just as dangerous.

White's plea is for a "council of American industry" which would constitute a forum where the ideas and conclusions of individual groups, trade, commercial, economic and cultural could be considered discussed and resolved. If such a council existed today, it doubtless would be as active against the Anglo-American pact as is, for example, the IPAA. Certainly there is great need for industry to unify its voice not only on cartels but on many other threats to business. But back to White's warning:

"If American industry cannot or will not, through such a council or otherwise, collectively consider and think through to the correct answers on this question of cartels—with the public interest always foremost in mind—and then undertake with one voice, not 100 voices, to express its honest conclusions and convictions courageously and without hedging, then let it prepare in silence for what it is about to receive, and not undertake to criticize or condemn what other groups with firmer convictions and fewer inhibitions may think and do in the matter."

Current industrial consideration of the cartel problem was characterized by White as having "something of the aspect of the cavalry regiment that was reported to be charging in all directions at once."

Declaring that the subject of cartels "may be of even more importance than we dimly foresee at this time," White said, "What our national policies are going to be on this controversial subject will almost certainly shape not only our foreign trade relations but to a great degree our political relations with our present friends of the United Nations and even perhaps the future peace of this war-weary world."

Dry Hole

SECRETARY Ickes was on the Town Hall program last Thursday and when the affair was over we felt that we should advise the good Secretary in the future to have some one write his answers to questions as well as his speeches.

In the parlance of the oil fields, when the Secretary got off of his prepared speech and came to the task of answering questions, he was a dry hole.

Doing the Job

THIS year the Standard Oil Company of Indiana will award service pins in recognition of from 10 to 40 years of service to 511 employes. Their total years of association with the company amounts to 9160.

This grand total of years is impressive in itself. When broken down, however, it becomes a tribute to the 511 workers for their determination and ability to do a job. At the same time it reflects credit to the organization for developing and maintaining policies that have proved mutually acceptable to company and employe. There is evidently a human relations story here that would make a brilliant chapter in the industrial history of this nation.

Dangerous Political View on Patents

NO ONE can listen to even a part of the deliberations of a meeting of the American Chemical Society without coming to the conviction that men are learning how to convert the materials of the earth and its atmosphere to the service of mankind. Already the accomplishments are startling and the possibilities far outstrip accomplishments.

The status in oil is proof of what lies ahead. For years it has been possible to break oil down by distillation. Only recently have men learned how to put the parts back together after even closer breaking apart. In catalysis and synthesis the oil hydrocarbon becomes a universe, it has so many possibilities.

What science can do with the raw materials at its command seems to have no limit.

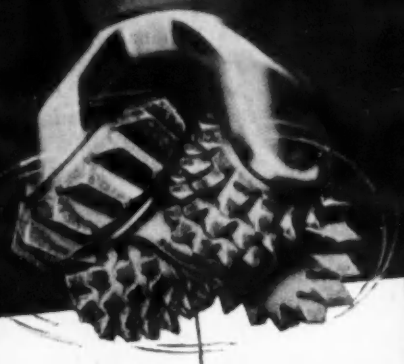
The disturbing prospect is the political attitude toward the accomplishments of science. Research comes into a patent if it has value for mankind. For some reason the politician cannot conceive of a patent as property. He is willing for the owner of a patent to erect buildings and install equipment. But the patent, the product which permits the building and its equipment does not hold high favor.

Such terms as "patent pool" and "cartel" cause the political fur to bristle, however smooth it may remain in the presence of the word "property."

The ownership of several patents may be a "patent pool." When men deal in the administration of what patents permit, they may form "cartels." It would be helpful if men in government would reveal how corporations with headquarters in different countries are going to exchange benefits of patent holdings without forming "cartels." Governments form "cartels" when they agree to the apportioning of market territories.

The politician insists upon "free access to patents." Under that requirement there would be little seeking of scientific accomplishments on which to base patents. Neither would there be cause for erecting buildings and installing equipment.

That harmful practices can come out of patent ownership is admitted. Ownership of buildings and equipment may accompany sorry business practice. No one recommends destroying the building in order to restrain the harmful practice.



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It would be helpful if men would agree also that there is no need for erasing the privilege of patent ownership in order to counteract evils that may accompany ownership.

Making the Best of Returned Employes

RICHMOND, Virginia, in a survey of its servicemen, found out some interesting facts which affect the problem of reemployment of veterans. Among other things, they are:

About 70 percent of the local officers, up to and including the rank of major, were under 30 years of age. Most of these men were earning more money and had more responsible positions, comparatively, than they had had in civilian life. Many of them had gone directly into the Army from high school or college and therefore had no actual employment or business experience. Other servicemen, on the contrary, had prewar business experience which was being amplified by their military duties.

Most companies are recognizing the opportunity which servicemen have had to develop their capabilities and are determined to try to return them to jobs commensurate with their capacities. The rapid advancement of many boys in the service suggests also that perhaps companies have not always made the most of their manpower. Initiative in placing responsibility on an employe is equally as important as readiness on that employe's part to assume it.

Latin-American Market Prospect

A MARKET of two hundred and sixty-eight million dollars worth of equipment and facilities in the mining and petroleum industry in Latin America, is probable for 10 years after the war, according to a report released from the Office of Coordinator of Inter-American Affairs.

"These assumptions," the report says, "are made without taking into account the amount European countries might contribute, or without certain knowledge on the proportion of new and used equipment to be bought which would affect the anticipated dollar totals."

Our national prosperity in the post-war world will need larger foreign markets.
—RALPH W. GALLAGHER, president, Standard Oil Company (New Jersey).

Production Research Project Commended

THE Pennsylvania Grade Crude Oil Association is to be commended for its activity on production research. A $300,000 research program is now getting under way by this association, designed to improve recovery in the Pennsylvania region.

Plans call for expenditure of $100,000 a year through 1945, 1946 and 1947. Half the cost is to be borne by the association; the balance of the money is to be raised by subscription from the industry, including members and non-members of the association.

It is said that the amount to be spent over the three-year period is the largest sum ever allocated to research by any one particular oil region in the country. The cost appears small, however, when compared with what is hoped for. Recognized authorities believe that the Pennsylvania Grade sands will still contain five billion barrels of oil when all known recovery methods have been exhausted. If but 20 percent of this remaining oil can be captured by means of exhaustive research, productive life of the region will be doubled. Such an accomplishment would indeed be a "major strike."

But whether the 20 percent goal is reached or not, research of the type being undertaken will pay big dividends. The problems will be attacked from both a practical and theoretical viewpoint. The best technical men and facilities available are now being obtained that the work may be in full progress by the first of the year. Some problems will be solved in the field; others will be taken to the laboratory. The payoff may not be as quick as comes from wildcatting sometimes, but the ultimate results are likely to be very favorable.

Oil Industry's Role In Air Development

AN AGGRESSIVE and imaginative industry capable of rapid expansion must back up our air force after the war if we are to retain our present position of leadership. Speaking before the recent National Convention of the American Legion, in Chicago, Assistant Secretary of War for Air, Robert A. Lovett, stressed the importance of keeping up with the phenomenal progress being made in the air.

"Today," he said, "we have the most modern and most powerful air force in the world, measured by crews, by aircraft, or by supporting industry. We must retain this leadership. This means maintenance, with full public support, or a strong, permanent air force with skilled personnel and up-to-date equipment. A second-class air force is worse than useless. It is a positive danger in that it may create a false sense of security. A first-class air force depends on quality. This means constant improvement and replacement. It is therefore, absolutely essential that our air force be backed up by an aggressive and imaginative industry capable of rapid expansion."

This is a challenge to the oil industry. As aircraft are improved there must be corresponding developments in fuel and lubricants. The oil industry has proved during this war that it is capable of meeting any requirement demanded of it, and it is safe to predict that this will hold true in the growth of air development, both military and civilian.

Sample of Economics by Edict

ONE of the classical adventures in keeping accounts comes out of Washington, evidently in hope it will be accepted in the corn belt. It is the simple proposition that the cost of butadiene from grain alcohol be reduced by charging off the cost of the plants by which it is made. By such, as the Washington reasoning suggests, butadiene then can be made from the grain source at as low cost as it can be made from oil as a raw material. (Evidently there would be no corresponding charging off in behalf of the petroleum plants.)

It seems a bit inconsistent to be considering such preposterous matters at a time when the military needs more and better heavy-duty casings and commercial trucks and buses are shy of rubber. Still, the way of the politician can not be ignored.

The cost of synthetic rubber will not and should not be known until after the war. All data thus far given, however, indicates that butadiene from butylene can be made for about one fourth the cost of that from grain alcohol. This means that finished GR-S rubber from oil costs about one third of that from alcohol.

If that persists it may be that even charging off the cost of the alcohol plants will not be sufficient to match costs. In that case, perhaps some wizard in economics will find it feasible to shift the cost from grain over to oil in the form of a tax.

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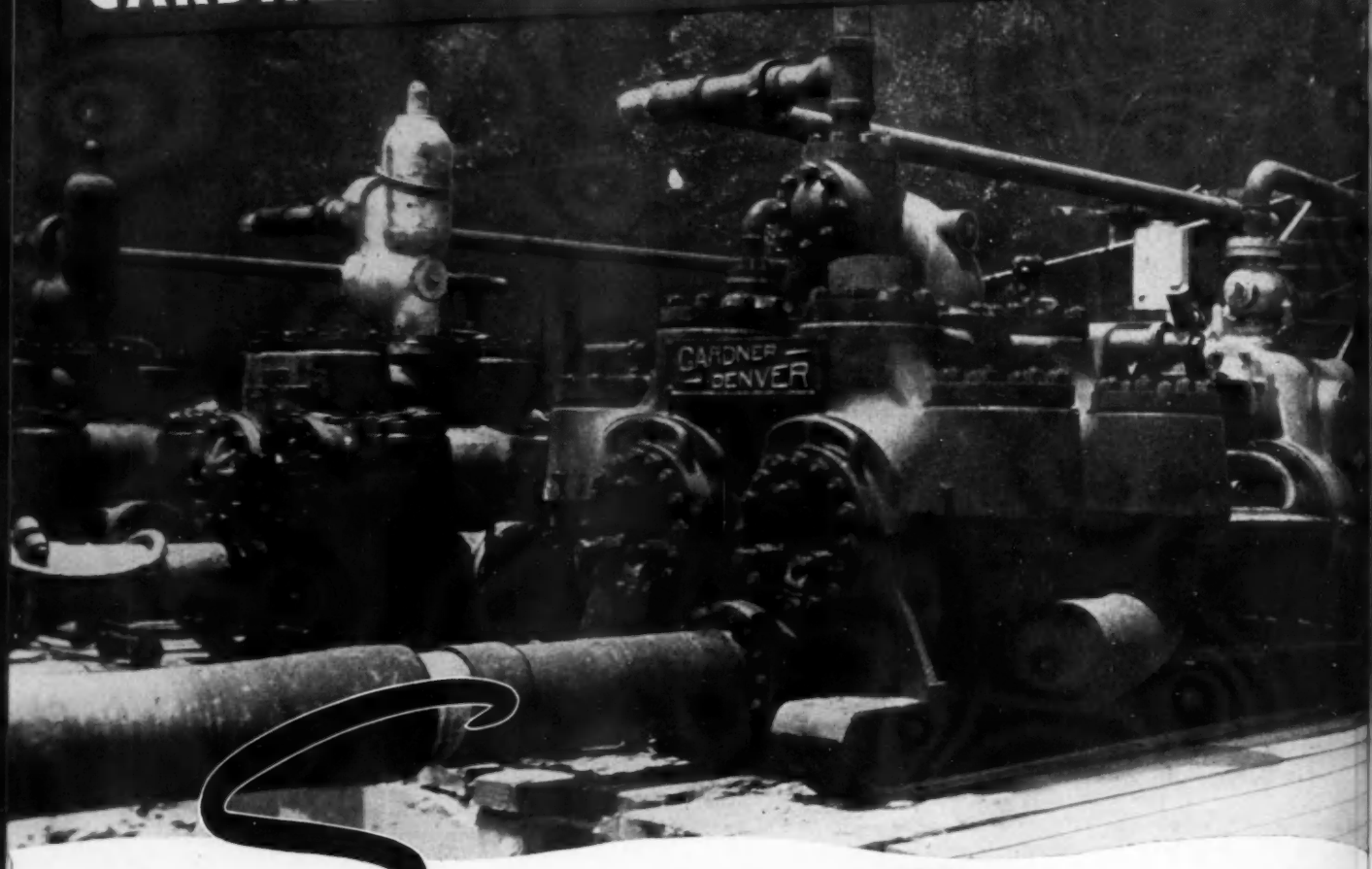

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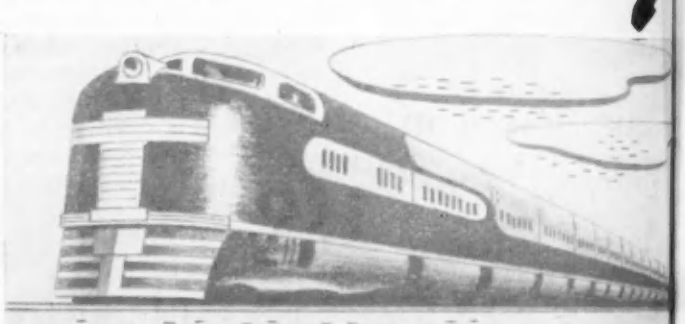

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SERVING THE OIL AND GAS INDUSTRIES

WASHINGTON ROUNDUP

By BERTRAM F. LINZ, Washington Correspondent

A SERIOUS break between PAW and PIWC over the Anglo-American oil agreement was narrowly averted last week when the Council, heeding the urging of Administrator Ickes, rejected a resolution condemning the proposed treaty.

PIWC Considers Pact—The international pact was the major subject of discussion at the Council's 32nd meeting, brought up following three days of consideration by members of the national oil policy committee, during which they were warned by Deputy Administrator Davies that their action on the agreement might imperil the close relationship between the industry and the government.

Hill and Pew Oppose—Led by J. Howard Pew, president of Sun Oil Company, however, the opposition to the agreement was carried to the floor of the council chamber in a resolution by George A. Hill, president of Houston Oil Company supported by Ralph T. Zook, president of the Independent Petroleum Association of America, where a strong plea by Ickes that criticism of the document be accompanied by constructive suggestions for its improvement averted favorable action on the resolution.

Radio Needs Outlined—Radio needs of the industry, particularly its geophysical and pipe lines branches, were laid before the Federal Communications commission during the week at hearings through which the commission is laying the groundwork for a postwar reallocation of frequencies for various types of service.

Spacing Rules Relaxed—Relaxation of West Texas spacing rules was announced by PAW in one of a series of orders easing off wartime restrictions, the forerunners, it was said, of an increasing number of releases from regulations as time goes on.

Davies and Ickes Block Action by PIWC in Opposing Oil Agreement

A vigorous attack upon the Anglo-American oil agreement, precipitating a three-hour debate, marked the October session of the Petroleum Industry War Council, paving the way for further studies of the document by the national oil policy committee with a view to making "constructive suggestions" for its clarification and improvement.

The discussion was touched off by a resolution condemning the agreement introduced by George A. Hill, Jr., of Houston Oil Company and supported by Ralph T. Zook, president of the Independent Petroleum Association of America and other minority members of the national oil policy committee, following three days of consideration of the matter prior to the meeting. But the council heeded a plea by Deputy Administrator Davies not to do anything which would imperil the close relations existing between the government and the industry.

During the committee's meetings, both Davies and Charles Rayner, petroleum adviser to the State Department, met with the oil men in an effort to head off anything which might lead to a split between the Council and PAW and precipitate oil into the political campaign as an issue.

From one source came a story, denied in all official quarters, that members of the committee had conferred with Administrator Ickes on the projected resolution in a stormy session in which the Administrator was said to have challenged the Council's authority to go into postwar matters and threatened to dissolve the organization if the resolution was brought up.

A way out of the situation was opened by Ickes in a letter to PIWC Chairman William R. Boyd, in which he said "I understand that the PIWC and certain of its committees desire to register objection to the recently negotiated Anglo-American oil agreement.

"If the Council or any of its committees do so desire to record with me such views on the subject, I request that when they make known their objections, they likewise make known in specific language exactly how, in their view, the existing document might be revised so as to remove the points of objection cited. This would be in the interest of the creative and helpful approach, as opposed to a purely destructive one."

While a majority of the committee were receptive to this approach, several minority members sought an immediate showdown, and took their resolution into the meeting, where J. Howard Pew, president of Sun Oil Company, and others delivered attacks on the agreement. The resolution was defeated by a vote of 22 to 11, but with the definite understanding, demanded by some of the agreement's opponents, that the action was not to be construed as favoring the treaty nor as restricting the right of any member to carry the matter to the Senate Foreign Relations Committee, which is planning to hold hearings on it next month.

Davies' Explanation

Because of conflicting stories circulating in Washington, Davies, after the Council meeting explained the situation to members of the oil press.

He pointed out that when the agreement was in process of negotiation, PAW officials made arrangements to defer its application until the industry could make its views known. Further, he declared, there has never been any resistance in PAW to the expression of views by the industry.

"Not knowing what form it would take, we put in that assurance that the industry and the public would have an opportunity to react," Davies said. "And we went one step further; when President Roosevelt decided to send it to the Senate, we hoped for Senate committee hearings and I went to Senator Maloney and told him we would request that he call industry representatives.

"All the way through, there has been a disposition to follow the recommendations of oil industry interests and to get their reaction. What we are trying to do is to get that industry expression in some coherent form and in some constructive form."

Davies contended that the principles laid down in the report of the foreign operations committee some months ago were incorporated in the agreement with the exception of the plan of organization on which, he pointed out, the PIWC had never expressed itself definitely.

Sees No Federal Control

The deputy administrator suggested that no matter how the agreement was written, its language would be susceptible of differing interpretations, but he emphasized that neither he nor PAW's legal staff had viewed its provisions as setting up federal control of the industry.

If the industry will make specific recommendations for changes in the agree-

ment with which PAW can go along, he promised, they will be taken up with the State Department. Such assurance would not be given, he added, if the Department had not given indication of its readiness to consider revisions.

At the same time, he said, the agreement has already been signed by both parties and any revisions which the United States may seek must be acceptable to the British government before they can be made effective.

"I thought we were doing a great job for the country and for the industry," Davies commented. "They (the industry) urged this point so, and we saw ourselves the absolute necessity of there being some collaboration, at least between this country and England, If we are to have an orderly oil business after the war."

Denial by Davies

Davies denied flatly the story that Ickes had threatened to dissolve the council if it went through with a resolution of the agreement, explaining that he had talked with the committee during its deliberations, urging that it develop recommendations for changes to go with any report it made on the pact.

At the same time, he said, he pointed to the cordial relations which have existed between PAW and PIWC and argued that any condemnation of the agreement at this particular time, at the height of the political campaign, could be interpreted by Ickes only as a personal affront, in the face of which, while there still would be a Council, its relations with the administrator could not help but suffer.

Ickes himself, Davies said, never entered into the picture beyond sending his letter urging that constructive suggestions be submitted. The Administrator did not meet with the committee and did not talk with any members until he went into the conference room to address the Council.

Pew's attack on the agreement was based on the charge that its language is so "vague and ambiguous" that it is without positive meaning or, alternatively, a blank check "which would give to the federal government unlimited and unspecified powers of the greatest scope over every activity of our industry."

His own conclusion, he told the Council, was that "this is a deliberate attempt to place the American petroleum industry under tthe bureaucratic control of the federal government," which could be achieved only through embroiling the domestic oil industry in a vicious cartel system, halting its progress and detrimental to the welfare of all.

"Despite vague, ambiguous and double-talking terms, it is clear to anyone who can read the English language that the commission, which the agreement creates, would have authority to propose undertakings for the control of prices and the allocation of production and marketing quotas," he asserted. "This agreement sets forth objectives which can be achieved only through production control, or control of marketing, or control of prices, or all of these, and I challenge anyone to dispute this assertion."

Cartelized or Free

Pointing out that for more than 30 years the industry has grown great by shunning all cartel practices and by engaging in spirited competition, Pew warned that the country cannot be cartelized in its foreign trade and free in its domestic enterprise, and "once we start to regiment through allocations, price fixing and production controls, our activities in the foreign field, we of necessity will have forced upon us by the government restrictive measures upon operations that fall wholly within the domestic field."

There can be no distinction between so-called "private" cartels and cartels under government control, he contended.

"Entirely aside from the general antipathy which the petroleum industry has against monopolies," Pew told the council, "it would be physically impossible to form a private cartel arrangement which included every American petroleum company and individual producer. Those outside of the cartel arrangement within a reasonably short time would succeed in defeating the entire conspiracy.

"To make a petroleum cartel effective in this country, it must necessarily be implemented by the lash of governmental authority so that every unit in the industry, every independent producer, every small refiner, as well as large companies, must conform to the cartel restrictions. This is the type of cartel inherent in the Anglo-American agreement. Such a cartel would mean the end of thousands of small, independent producers and refiners. These are the very men whose initiative and ingenuity have made our industry great. There is no place under a cartel supported by the power of government for either independent or independent operators.

"Moreover, the type of cartel projected by the pending agreement would deny the consuming public any freedom of choice and leave it to the mercies of a super-bureaucratic OPA. All this would be done in the name of a Tugwellian 'planned economy' under which a few bureaucrats arrogantly usurp the right to tell the American people what is best for them in every detail of their lives."

There is no difference, Pew asserted, between an economic system where the government dominates an industry, such as is allegedly comprehended in the agreement, and the Nazi system of national socialism against which we are fighting a war.

"I am convinced that if our country embarks upon this step it will be only a short time before our industry passes into government-ownership, with all the paralyzing inefficiencies that attend efforts of government to operate industry," he commented.

"Can it be that the framers of this agreement are desirous of taking a short cut designed to change our American system overnight to the status of the German system of national socialism?"

Dictatorial Threat

The very fact that promises have been reported to have been made that if any evils are inherent in the language of the agreement, such powers will never be used, Pew found to be an indictment of the arrangement.

"I have no doubt that if this agreement is ratified, the Executive Department, and in all probability the Supreme Court, will construe its language as vesting in the Chief Executive such powers as will effectuate the policies set forth," Pew declared. "These are surely dictatorial powers and history has taught us that dictators when clothed with power invariably do dictate."

Some attention should be given, Pew suggested, to the question where the agreement originated and why. It did not originate in the industry, which has expressed opposition to it, he said; it did not originate in Congress, which has often gone on record as opposed to cartel and monopoly agrements, and the Department of Justice has disavowed responsibility.

Whether it originated in the Department of State is not clear, he said, but "at all events, we do have a right to know where this scheme originated and the purposes for which it was formulated. Likewise we have a right to know what relationship, if any, exists between the Anglo-American petroleum agreement and the Bretton Woods monetary agreement, the Dumbarton Oaks understanding and the dozen and one other commodity agreements which are in the process of being negotiated on the pretext of promoting foreign trade in the postwar years.

"The oil cartel agreement is the first of a long series of similar cartels which the economic planners are preparing to ram down the throats of the American people. Because oil is the first of these agreements, and because we have had the opportunity of familiarizing ourselves with all of its implications, it becomes our solemn duty, as American citizens, to state our objections clearly and fully so that the Senate of the United States, as well as the American people, shall have a full understanding as to what is comprehended."

Much has been said, Pew concluded, to the effect that whether we like it or not, other nations are so wedded to the cartel system that we must accept that mehod of doing business in the foreign field.

"We do not have to do anything of the sort," he declared. "So great will be our economic strength after this war that the United States will not have to submit in foreign trade to the dictatorship of any nation. No international cartel arrangement can be made fully effective without the participation and the cooperation of this country and its nationals.

"Instead of supinely capitulating to the reactionary, backward cartel system, our government should exert leadership for the elimination of cartels and demand

Arkansas Gas Corporation Headed by D. W. Harris

Arkansas Natural Gas Corporation, Shreveport, Louisiana, announces that D. W. Harris has been elected president. He has served as vice president and general manager of the company and its subsidiaries since 1928. Previously he held several positions with Cities Service Oil Company. He is a director of the American Gas Association, a member of the Bankers Club of New York, and has been active in affairs of the oil and gas industry for many years.

D. W. Harris

that American business should be free—free to engage in world trade without being forced to submit to cartel restrictions."

Petroleum Economics

The monthly report of the committee on petroleum economics was confined to a resume of five studies which have been made this year on the probable postwar demand for petroleum and its products, respectively by THE OIL WEEKLY, Albert J. McIntosh of Socony-Vacuum Oil Company, E. T. Knight of The Atlantic Refining Company, *World Petroleum Magazine* and C. L. Burrill of Standard Oil Company (New Jersey).

The committee developed no conclusions, but contented itself with tabulating the estimates of the several writers of demand for crude and refined products.

At the pre-council meeting of the committee on production, John R. McWilliams, PAW director of production, submitting his first report, pointed out that outstanding features of the situation are that crude production is at an all-time high, the trend of the crude stocks curve, which has been generally downward for some time, appears to have been arrested, and that total completions for August were at a higher rate than at any time since November, 1941.

McWilliams disclosed that the 27,000-well drilling program for next year contemplates 4700 wells in District 1, 9800 in District 2, 9800 in District 3, 700 in District 4 and 2000 in District 5.

To cover production operations and MRO for the first quarter of next year, he said, steel requirements have been submitted to the materials division calling for 265,500 tons of carbon steel and 43,500 tons of alloy steel for the former and 22,500 tons of carbon steel and 7500 tons of alloy steel for production MRO.

The PAW production chief also reported the result of revision of estimates of maximum efficient rates of crude production for the country based on development of recently discovered important new reserves, in particular the Elk Hills Naval petroleum reserve in California and the West Edmond field in Oklahoma, and the reversal of the downward trend in Mississippi.

He reported that the revised estimates place the maximum efficient rate for the United States at 4,620,000 barrels daily for the current quarter, 4,610,000 barrels for the first quarter of 1945, 4,600,000 barrels for the second quarter, 4,585,000 barrels for the third quarter and 4,570,000 barrels for the fourth quarter, these figures being approximately 85,000 barrels daily higher than the previous calculations, but to be considered only as preliminary pending the completion of a field-by-field survey now being conducted.

Report on Materials

Although the supply of raw materials is becoming easier, the demand of the domestic and foreign PAW programs will increase to meet the expanding requirements of the war, with the result that demand will cancel increased availability, and while raw materials may become a little easier, problems in supply will arise due to limitations in manufacturing capacity to produce critical items of finished equipment and components, the committee was told by Claude P. Parsons, PAW director of materials.

Parsons reported that 1806 rotary drilling rigs are now in operation in this country, and warned that difficulties in obtaining materials for their operation will increase as the number of active drilling rigs continues to rise.

"In addition," he said, "practically all of the foreign petroleum drilling programs are expanding, and the rehabilitation of liberated oil fields will come into the picture. As the petroleum equipment manufacturers in the United States are the chief sources of supply for drilling operations all over the world, the combination of an unprecedented domestic drilling program and the increased foreign demand may further amplify the critical shortage of drilling equipment."

In a review of the situation, Parsons reported that internal combustion engines, especially in the larger sizes, continue to be subject to more disturbing influences which affect deliveries than other critical items of equipment. Deliveries of small engines for pumping purposes, however, have improved considerably.

Due to the extremely high number of rotary rigs in operation and the fact that the number is increasing, many difficulties may be expected this quarter because the production of drill pipe and tool joints cannot be increased proportionately, he said. Rock bits again are beginning to get extremely critical, due to increased demand, but PAW has started action to expedite machinery needed for increased production.

The supply of lumber continues very short, but the truck situation has been eased by the action of the ODT in filling practically all of the applications filed by operators for emergency needs for medium and heavy trucks. The WPB has authorized the manufacture of 10,000 light trucks in both the first and second quarters of next year.

Fears that the current investigation of natural gas by the Federal Power Commission is an attempt to exercise control over its production which would extend over the production of crude oil and might involve the production of other commodities refined from natural gas and crude petroleum were expressed by members of the committee. It was indicated by McWilliams that the matter was under consideration in PAW, but no intimation was given what action might be taken.

Price Increase Favored

A verbal report by William B. Heroy, PAW director of foreign production, developed that no immediate sharp reduction in production requirements to supply the European theatre of war is in sight, but sharp increases in requirements to supply the Pacific theatre are expected. Increasing tanker hauls in the Pacific may offset any reduction in the Atlantic, he said.

A report on manpower in the production branch of the industry was submitted by a special committee showing that all activities in exploration and production are in serious need of personnel.

The council again adopted a resolution favoring a general increase in the price of crude oil, to be accompanied by corresponding increases in the wholesale and retail ceilings for refined products, and expressed its opposition to a suggestion submitted to Stabilization Director Fred M. Vinson by Representative Wright Patman, chairman of the House Small Business Committee, that crude prices be raised without increasing the price of products to the consumer.

A resolution also was adopted calling for a month-to-month increase in the production of premium gasoline as the supply of tetraethyl lead improves as preferable to deferring any increase until the present curtailment can be substantially or entirely removed.

Holmes and Whitehill New Members of PIWC

Appointment of Howard Holmes of Dallas, Texas, newly elected president of American Association of Oilwell Drilling Contractors, and Howard J. Whitehill of Tulsa, new president of National Stripper Well Association, as ex-officio members of PIWC was announced by Deputy Administrator Davies last week. They will succeed A. H. Rowan and J. D. Sandefer, Jr., respectively.

Shad Polier has resigned as director of the fuel and consumer goods enforcement division of OPA, to return to the private practice of law in New York. He will be succeeded November 1 by William E. Remy, now in charge of enforcement in the Dallas region.

OPA also announced the resignation on October 25 of Myron R. Holmgren of Chicago as chief of the fuel rationing branch, and appointment of James S. Scully, formerly regional fuel rationing officer in Seattle, as his successor. Holmgren is returning to Hughes Oil Company as executive vice president and general manager, after a four-months leave of absence. He will continue to assist the fuel rationing division as a consultant and will also resume his membership on the industry advisory panel, on which he has served since February, 1943.

Porter L. Howard has resigned as deputy assistant director of the liquid transport department of ODT to return to Sun Oil Company, from which he took leave of absence in February, 1943, but will continue as consultant to Assistant ODT Director Fayette B. Dow. He will be succeeded by Richard H. Lamberton, formerly assistant to the treasurer and in charge of personnel of Union Tank Car Company, Chicago, who joined ODT in March, 1943, as assistant to Dow.

Synthetic Fuel Plant Planned Near Pittsburgh

Plans for the construction of a research and development laboratory by the Bureau of Mines at Bruceton, Pennsylvania, Pennsylvania, south of Pittsburgh, to carry on the program for demonstrating commercial possibilities of producing fuels from coal and oil shale were announced by Secretary of the Interior Ickes October 25.

Ickes said that buildings comprising the large laboratory, to be the most modern of its type in the world, should be ready for occupancy in a year.

The laboratory, consisting of three large three-story buildings, a power house and several smaller service buildings on seven acres of land, will not engage in the demonstration of methods for commercial production of synthetic fuels but will work out the "kinks" in the various processes which are to be studied.

Needs of Oil Industry for Radio Facilities Are Outlined to FPC

Needs of the oil industry for radio facilities for the operation and protection of field crews and pipe lines were presented to the Federal Communications Commission October 24 during hearings which will be the basis for a new allocation of radio channels for postwar operations.

Radio communication is of particular service to the exploration departments "whose geologists and geophysicists range and search the tangled jungles and the lonely deserts", it was explained by Robert E. Allen, director of information for the American Petroleum Institute, in opening the presentation.

Portable radio, he said, not only speeds and improves the search for oil but has also contributed much to the personal safety of the searchers who venture into many hazardous localities in the course of duty.

War Devices Applicable

"The use of radio waves in the production of oil is at present limited largely to communication between the headquarters and remote fields and locations," Allen told the commission. "However, it is now thought that two or three of the highly successful secret weapons of the war using radio waves will be adaptable and applicable in the drilling and development of oil fields."

F. W. Littell of Shell Pipe Line Corporation, discussing the value of radio in pipe line operations, stressed the need for continuous reliable communication for efficient 24-hour operation of such facilities.

An exhibit was submitted by the petroleum industry committee of the Radio Technical Planning Board, setting forth that radio service is necessary to reach inaccessible and remote points where wire line facilities do not exist or the construction of wire lines in impractical; it is also highly desirable from the point of continuity of service as compared with wire-line communications which frequently fail due to floods, weather conditions and other catastrophies. Continued operation of pipe line systems and other petroleum industry functions also depend heavily on communications, therefore continuity of service is of prime importance.

The lack of adequate communication service, it was emphasized, results in waste of our essential national oil and gas reservoirs, and use of radio in isolated locations where no wire-line facilities exist would provide for safety of industry personnel and the public in time of emergency and provide for the protection of property as well.

"Service should be provided for all oil and gas producing areas and transportation facilities used in connection therewith," it was declared.

PAW Gives Support

The industry's position was supported by PAW, with Ralph J. Schilthuis, assistant director of production, presenting briefly a survey of the supply requirements and the efforts of the government to expand exploratory and development activities.

Schilthuis did not go into the technical field, confining himself to an explanation of the importance of giving every possible assistance to the drive to increase our oil resources.

"The petroleum administration was established as a wartime agency and does not have responsibility in post-war matters," he pointed out. "However, to the extent that the problem of reallocating radio frequencies to the various classes of radio transmission services may affect the operations of the petroleum industry during the war, PAW is concerned."

The importance of radio in the actual finding of oil was developed by W. M. Rust, Jr., president of the Society of Exploration Geophysicists, and Benjamin B. Weatherby of the Geophysical Research Corporation, Tulsa.

Seismic prospecting was first started in this country just 20 years ago, the commission was told, and at present some 290 crews are operating in the United States at an annual cost of between $35,000,000 and $40,000,000.

In recent years, seismic prospecting has been finding better than one half of the new oil, and statistics indicate that wildcats drilled on technical advice have about three times as much chance of being producers as those drilled without such information, it was said.

At least 44 frequencies should be provided for this service, it was urged.

Mississippi-Alabama Group Pushes Organization Plans

Officers, directors and organization plans for the Mississippi-Alabama Oil and Gas Association tentatively outlined October 20 were to be decided on Friday at Jackson, Mississippi.

The 126 present at the first meeting expressed the need for an independent group representing the oil operator, royalty and land owner and others in the problems arising from rapid expansion and development of the oil industry.

J. C. Hunter, president of the Mid-Continent Oil & Gas Association, explained the methods used by the general organization in meeting common problems. Decision was to be made Friday on uniting as a branch of Mid-Continent or forming a separate organization. Sentiment expressed indicated it will affiliate with the general association to enjoy the experience and influence of the national group.

It was resolved that the ten-member sponsoring committee act as a nominating committee and draw up organization plans, making recommendations for officers and directors which were to be presented Friday.

Gasoline of 91 Octane Rating Removed from List

Revision last week by PAW of the list of critical petroleum products shows that alkylate, hydrocodimer, codimer, isobutane, B-B cut, isopentane, toluene used by Army ordnance, butadiene, petroleum synthetics, and hydroformate and toluene used in aviation gasoline are still highly critical and subject to first preference. Gasoline base stock of 91 or better octane number, to be used in the 100-octane blending program, however, has been taken out of that group and shifted to Group 2, consisting of products of second preference and critical.

With aviation gasoline of 87-octane and below and 80-octane all-purpose gasoline shifted to Group 3, the second group now includes base stock of 91 or better octane number for the 100-octane blending program, 91-octane aviation gasoline, select gas oil charging stock for aviation gasoline, special naphtha charging stock for hydroformer charge, and microcrystalline wax in the amount and at the plant specified.

The third group includes 87-octane aviation gasoline in the amounts and at the plants designated by PAW, 80-octane all-purpose gasoline, 73-octane aviation gasoline in the amounts and at the plants designated, 7-0-2 military diesel, aviation and heavy military lubricants, diesel lubricants, and heavy naphtha charging stock for production of butadiene.

The major result of the shifting of 87 and 80 octane gasoline to Group 3 will be to reduce the number of plants entitled to priorities for crude for its production and a better general distribution of crude for the non-priority refineries.

Well-Spacing Rules for West Texas Area Changed

Modification of well-spacing regulations in 45 West Texas counties to permit simultaneous development of shallow and deep zones was provided for by PAW October 24 in Supplementary Order 15 to PAO-11, regulating the use of drilling materials.

The order provides for a 20-acre spacing in the zone above 3400 feet and a 40-acre spacing for wells below that depth. Formerly, the 40-acre spacing was required for operations at all depths. Each of the two zones may be developed independently of the other, under the new regulations, which leave to the Texas Railroad Commission the requirements as to distance between wells and distance of wells from property lines.

The only exception to the order is for the Yates field, Pecos County, which had been fully developed before the war.

Counties covered by the new spacing provisions are Andrews, Borden, Brewster, Cochran, Coke, Crane, Crockett, Crosby, Culberson, Dawson, Dickens, Ector, El Paso, Gaines, Garza, Glasscock, Hockley, Howard, Hudspeth, Irion, Jeff Davis, Kent, Kimble, Loving, Lubbock, Lynn, Martin, Menard, Midland, Mitchell, Presidio, Regan, Reeves, Schleicher, Scurry, Sterling, Sutton, Terrell, Terry, Tom Green, Upton, Ward, Winkler, Yoakum and Pecos.

At the same time, PAW issued a formal directive, 78, to replace Revised Plan 15 for the regulation of sales, exchanges and loans of crude and products by and among refiners in the Southwest.

The directive is substantially the same as Revised Plan 15 which was issued in August, 1942, and the primary purpose of its issuance was to simplify and clarify the procedure. It applies throughout District 3 only.

Also incorporated in the directive are provisions for the joint use of facilities by operators and the designation and definition of the functions of the applicable industry committees.

McCarthy Thinks Oil Pact Presages Effort to Control All Commodities

Speaking before the East Texas chapter of the American Petroleum Institute at Kilgore, on October 25, Glenn H. McCarthy of Houston, independent oil operator, urged vigorous opposition to the Anglo-American oil treaty, already signed by principals of the United States and Great Britain, and needing only a two-thirds majority in the Senate to make it become the law of the land, even though it be in defiance of the powers reserved by the states in our federal constitution.

Several hundred operators attending the meeting signed a petition opposing the treaty after McCarthy spoke.

McCarthy pointed out that, once ratified, Congress will be forced to enact legislation for control of all branches of the industry. There would follow not only federal control, but control by an international commission, many of whose members will be nationals of foreign countries whose only object would be access to world oil supplies at cheap prices.

Essential points from the preamble of the agreement show, according to the speaker, that ample supplies of petroleum available in international trade are essential for the security and welfare of nations, that foreseeable resources are adequate to meet this demand, that Great Britain which owns only 1 percent of the world's oil production proposes to enter as equal partner with the United States in controlling production, marketing, and distribution of which the United States owns 67 percent.

"The language of the agreement is such that we may well believe we are to be controlled by a vast, international OPA, set up jointly by the two governments and other countries coming into the agreement, with powers to determine and fix price, volume of sales, market, and the like," he said. Oil men may be certain that since Great Britain is interested as a consumer of oil rather than as a producer, she wants to obtain oil at a low price. Under such an agreement Great Britain can demand equality in price ranges with United States consumers. As a result, any advantage we have obtained by hard work, foresight, initiative and individual enterprise and by our vast natural resources will be shared with Great Britain and her nationals. Great Britain gives nothing and receives all. The United States receives nothing and gives all."

Commenting on Article 1 (expansion of development of petroleum resources for international trade on a world-wide basis), McCarthy said in order to effectuate such principles "the Commission must, of necessity be clothed with power . . . to have such power the Congress of the United States must enact laws that will allow an international organization, at least one half of the members of which will be citizens of countries other than the United States, to tell us where we can look for oil, how many wells we can drill and how deep, how much we can produce, how much we can refine, what products can be made and to whom and at what price they can be sold. Any recommendation made by the Commission must be adhered to by the United States and the proper legislation enacted to carry it out. To do otherwise, or fail to act, would be a breach of the pledged faith of the United States of America."

In speaking of one provision in which it is stipulated that supplies of petroleum should be available in accordance with the principles of the Atlantic Charter, McCarthy reminded listeners of the utterances and actions of Churchill and Stalin which have disavowed principles of the charter.

In summation, McCarthy urged opposition to ratification of the treaty on six principal grounds:

1. It pledges the oil reserves and industry of the United States to the principles of international control and distribution, committing the nation to a policy foreign to the philosophy of its foundation and progress.

2. Resultant international and federal control would impose the one last restriction that would drive independent oil operators from the industry.

3. It would result in control of the industry by domestic and international bureaucrats, exchanging bungling of bureaucracy for experience and training.

4. It lacks reciprocity and mutuality, giving a nation producing 1 percent of the oil an equal say with one producing 67 percent, in determining production, marketing, distribution, and price.

5. By the ingenious device of an international treaty, the present administration can cause legislation for control of the oil business that under existing laws would not be possible.

6. It legalizes a cartel.

McCarthy warned that what the government can do in one industry it can do in another and that control by similar methods of production of every item on the list of American commodities, including clothing, sugar, steel, lumber, foodstuffs, etc., is possible.

Oil Production Shows Slight Drop for Week

United States crude oil production averaged 4,737,585 barrels daily in the week ended October 28, reports to THE OIL WEEKLY revealed. That was 7665 barrels a day less than output in the previous week.

While that change was comparatively small, individual states showed considerable fluctuations, which largely canceled each other.

California was down 6800 barrels to 885,200 daily, Kansas off 8700 to 286,950 daily, Michigan down 7900 to 44,300 per day, Mississippi declined 3650 to 49,050 daily. On the other hand, increases were registered including the following: Illinois 9100 to 199,800 barrels daily, Kentucky 3900 to 28,650 per day, Oklahoma 4000 to 347,350 daily, Montana 2030 to 24,700 daily, New Mexico 1350 to 104,900 per day. Texas was unchanged at 2,133,350 barrels a day, and Louisiana was practically unchanged at 362,600 daily.

Crude Oil Production in the United States

(Estimates compiled by The OIL WEEKLY. All figures indicate daily averages, in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED October 28	October 21
Alabama	300	300
Arkansas	80,050	80,850
California	885,200	892,000
Colorado	9,600	9,250
Florida	50	50
Illinois	199,800	190,700
Indiana	12,550	12,500
Kansas	286,950	295,650
Kentucky	28,650	24,750
Louisiana	362,600	363,200
North Louisiana	72,850	73,450
South Louisiana	289,750	289,750
Michigan	44,300	52,200
Mississippi	49,050	52,700
Missouri	100	100
Montana	24,700	22,670
Nebraska	950	900
New Mexico	104,900	103,550
New York	12,850	14,050
Ohio	7,600	7,550
Oklahoma	347,350	343,350
Pennsylvania	38,100	38,200
Tennessee	35	30
Texas	2,133,350	2,133,350
Upper Gulf Coast	537,700	537,700
East Texas Field	371,350	371,350
Rest of Eastern Texas	149,500	149,500
Lower Gulf Coast	236,850	236,850
Southwest Texas	77,800	77,800
South Central Texas	19,750	19,750
West Texas	492,800	492,800
North Texas	148,800	148,800
Panhandle	98,800	98,800
West Virginia	9,100	8,500
Wyoming	99,450	98,850
Total United States	4,737,585	4,745,250

Texas Office Is Set Up To Oppose Oil Agreement

Active opposition to the Anglo-American Oil Treaty began on an organized basis this week in Austin, Texas where offices were opened in the Littlefield Building. "The Statewide Committee of Oil Operators Opposed to Senate Ratification of the Anglo-American Petroleum Treaty" is the official name of the organization.

Dr. Byron B. Boatright, Houston consulting petroleum engineer, is technical advisor to the committee.

Texas oil men are being circularized and literature is being prepared for speakers to present to service clubs and other organizations throughout the state.

Arrangements are being made for prominent speakers, including members of the Railroad Commission as well as oil men, to present the picture over the radio and before the Senate foreign relations committee.

All Restrictions Lifted On Oils for Coal Spray

All restrictions as to the types of oil permitted to be used for coal-spraying purposes were lifted by PAW October 24 on the recommendation of the Solid Fuels Administration.

Heretofore, only Nos. 5 and 6 and bunker C fuel oil, asphalt, and asphaltic products could be used to spray coal. Restrictions were lifted because many coal producers are not equipped to use the heavy grades of fuel oils. Spraying is undertaken to prevent windage loss and the freezing of coal into large masses that are difficult to handle.

Stripper Field Changes Are Announced by OPA

More pools in Indiana, Kansas, New Mexico, Oklahoma and Wyoming have been accepted by the OPA as eligible for the stripper-well subsidy and will go on the list effective November 1, as follows:

Indiana: Prairie pool, Posey County, 25 cents per barrel.

Kansas: All pools in the east half of Elk County, 35 cents; De Moss, Butler County, 35 cents; Jonce, Rice County, 25 cents; Soeken, Rice County, 35 cents; Kuske, Sedgwick County, 20 cents; pools underlying Sections 2, 9, 11 and 12, township 15s-20e, Douglas County, 35 cents.

New Mexico: Leo, Eddy County, 25 cents.

Oklahoma: March (Layton-Skinner), Payne County, 35 cents; Wewoka (Hunton lime), Seminole County, 35 cents; Price, Pawnee County, 35 cents; Breene, Osage County, 35 cents; Tull, Creek County, 35 cents; Cromwell (Gilcrease), Seminole County, 25 cents; Long, Hughes County, 25 cents; Mobbs, Wagoner County, 35 cents; Piggot, Osage County, 35 cents.

Wyoming: Pilot Butte (upper light oil), Fremont County, 35 cents.

Plans for providing relief for high-cost wells have been worked out, OPA officials said, and application forms are expected to be ready for distribution this week.

Damming-up of Stocks May Result in Shortages

Reluctance of dealers to stock up on heating oils as usual because of fears of a price break based on released stocks if the European war terminates in the near future, is causing a damming-up of products and may result in serious spot shortages this winter, it was warned October 27 by Deputy Administrator Davies.

Davies reported that already products are backing up to a point where refineries are without sufficient storage. Because of transportation difficulties in moving products from refineries to dealers, and the latter's shortage of drivers and trucks, he said, apprehension is felt that unless the situation is quickly corrected, some localities may be short of fuel oil in the event of a sudden spell of bad weather.

Federal Oil Taxes Keep Ahead of 1943 Collections

Federal revenue from the oil taxes fell off in September but continued well ahead of last year, it was reported October 25 by the Internal Revenue Bureau.

Gasoline taxes for the month amounted to $32,930,915 compared with $36,256,042 in August and $25,146,358 in September, 1943, bringing the total for the first nine months to $216,993,569 against $194,288,765 last year.

Receipts from the levy on lubricating oils were $6,079,396 for the month against $6,747,702 for August and $3,837,507 for September of last year, with the nine-month total of $35,215,496 against $34,966,538, while pipe-line transportation paid $1,420,930 against $1,563,986 in August and $1,132,911 in September, 1943, with the nine-month total $12,146,890 against $10,383,623.

Proposed New Bureau Would Control Disposal of Salt Water in Texas

Plans for a complete new bureau to control salt water from Texas oil fields have been outlined by the Texas State Department of Health. At a meeting of the American Water Works Association in Austin, A. M. Brenneke, salt water control engineer for the department, explained the new program, which would require enactment by the legislature.

He explained that salt water from oil fields is damaging potable water throughout the state, and pointed to the expense which various cities have encountered because their drinking water has been damaged. He also emphasized the prospect of injury to water used by various manufacturing concerns and to fresh water fish.

Brenneke found the present laws and penalties inadequate, but made no mention of lack of enforcement. He was inclined to a program which provides for faster action.

A few years ago this same department advocated a salt water control program and asked oil companies to contribute $50,000 to its support. This they declined to do, pointing out that the Railroad Commission has authority to require salt water to be handled properly in oil fields, and that the Game, Fish and Oyster Commission, as well as the Health Department, may bring suits for polution of the streams or of underground water.

Brenneke thought that a special tax either on salt water or on crude oil production could provide $75,000 a year, which he estimated would be sufficient for the new program. His specific recommendations are:

By statute, create a salt water control commission, composed of the State Health Officer, chairman of the Board of Water Engineers and chairman of Game, Fish and Oyster Commission. This commission would employ a qualified engineer as executive, together with an adequate staff to gather data, to operate the office, and prepare cases against violators.

By statute, instruct the Railroad Commission to shut down any oil well within five days after receipt of a certificate from the Salt Water Control Commission that salt water from a well was entering a water course or a fresh water bearing stratum of underground water, to a detrimental extent, such well to remain closed down until the producer made arrangements for the disposal of salt water that are satisfactory to the Salt Water Control Commission. Instruct the Railroad Commission that no oil from a well shut down is to be accepted in commerce during the shut-down. Require that no permit for drilling be issued by the Railroad Commission until the operator has filed plans approved by the Salt Water Control Commission, for control and disposal of all oil well wastes.

Authorize the Salt Water Control Commission to prescribe necessary regulations for enforcement and require prior approval of all proposed methods of salt water disposal contemplated by producers.

Assess a charge of one cent per 100 barrels of oil against the producer, to be paid monthly to the state by the first purchaser of oil from the well, this fund to be for the exclusive use of the Salt Water Control Commission in salt water control and enforcement.

Repeal all conflicting sections of the existing law. The cost of operating such an agency is estimated to be about $75,000 the first year and about $70,000 per year thereafter. One cent per 100 barrels of oil produced is adequate. Kansas charges four cents per 100 barrels of oil for supervision of salt water disposal.

California Well Now At 15,545-foot Depth

Standard Oil Company of California's KCL-20-13, world's deepest well, located in Kern County, California, was at the depth of 15,545 feet on October 27. Last week the depth was reported at 15,368 feet so good progress has been made during the period.

Previous holder of the world's record was the Phillips Petroleum Company's Ada Price 1 in Pecos County, Texas, which last spring reached 15,279 feet.

Butane Ban Effective From November to April

Delivery of butane or propane-butane mixtures for use as fuel in drilling operations where natural gas is available as a substitute fuel has been prohibited between November 1 and April 1, next, by Directive 79, issued October 24 by PAW.

Demand for butane in aviation gasoline and synthetic rubber programs, and increased domestic demand during the winter, will limit the quantity that can be made available for drilling operations, it was explained.

The limited supply which will be available, PAW said, must be conserved for those rigs that cannot obtain suitable natural gas for fuel.

Crude Price Changes

Effective 7 a.m., September 1, 1944 and until further notice following prices for crude oil purchased by Magnolia Petroleum Company from Silurio Devonian pool, Andrews County, Texas, below 25 gravity, 93 cents with 2-cent differential per degree of gravity beginning at 9 cents for 25 to 25.9-gravity up to a top of $1.25 for crude of 40-gravity and above, 100 percent tank tables.

Delay Treaty Stand

The Oil & Gas Association of Michigan's board of directors tabled a proposal to "take a definite stand" on the proposed Anglo-American oil treaty. The action was taken after Harold McClure, legislative secretary, questioned whether directors were fully informed on the proposed treaty.

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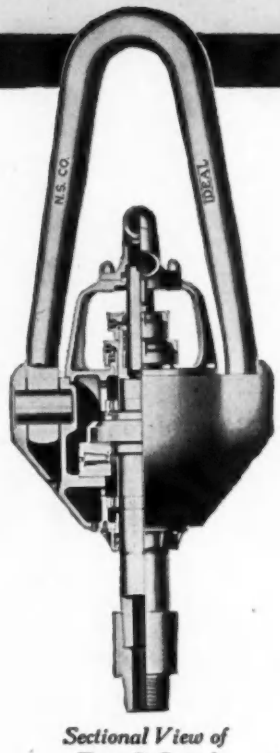
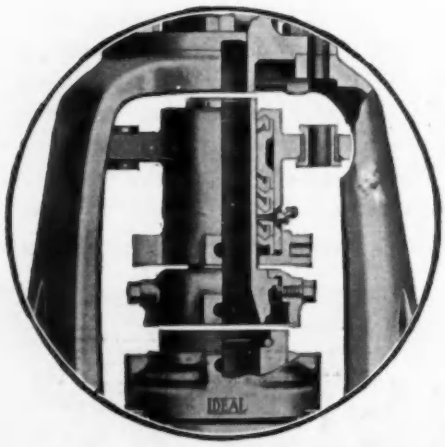


Sectional View of Type D Swivel



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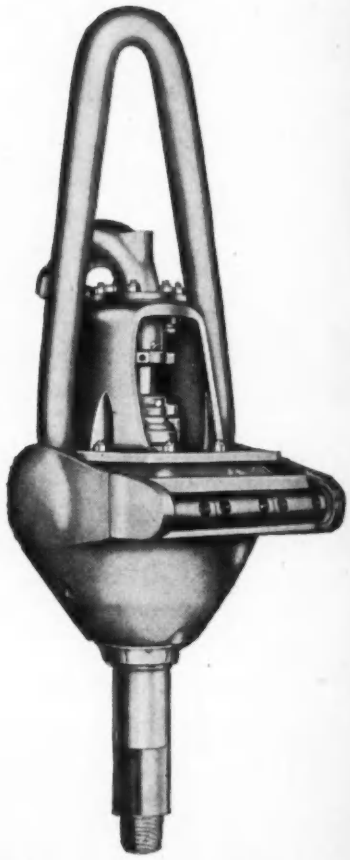

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Willamar Field Becomes Major Development

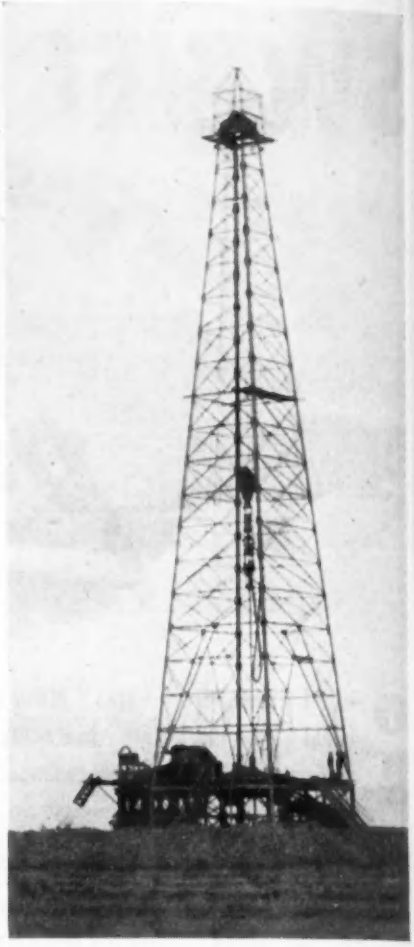
Big Southwest Texas pool brought in on one last swabbing tour in effort to gain show of salt water. Most development came three years after discovery

By GEORGE O. IVES, Staff Writer

WILLAMAR FIELD is now considered one of the major Southwest Texas discoveries of the past five years, but has had an unusual history in that it did not begin to enter the phase of major development until nearly three years after discovery, this despite the fact that the first few wells proved up a probable producing area of about 4,000 acres. The slow development was the result of a number of handicaps, including a limited market demand due to characteristics of the oil itself, wartime shortage of materials, and lack of an economical outlet for the crude. All three have since been corrected.

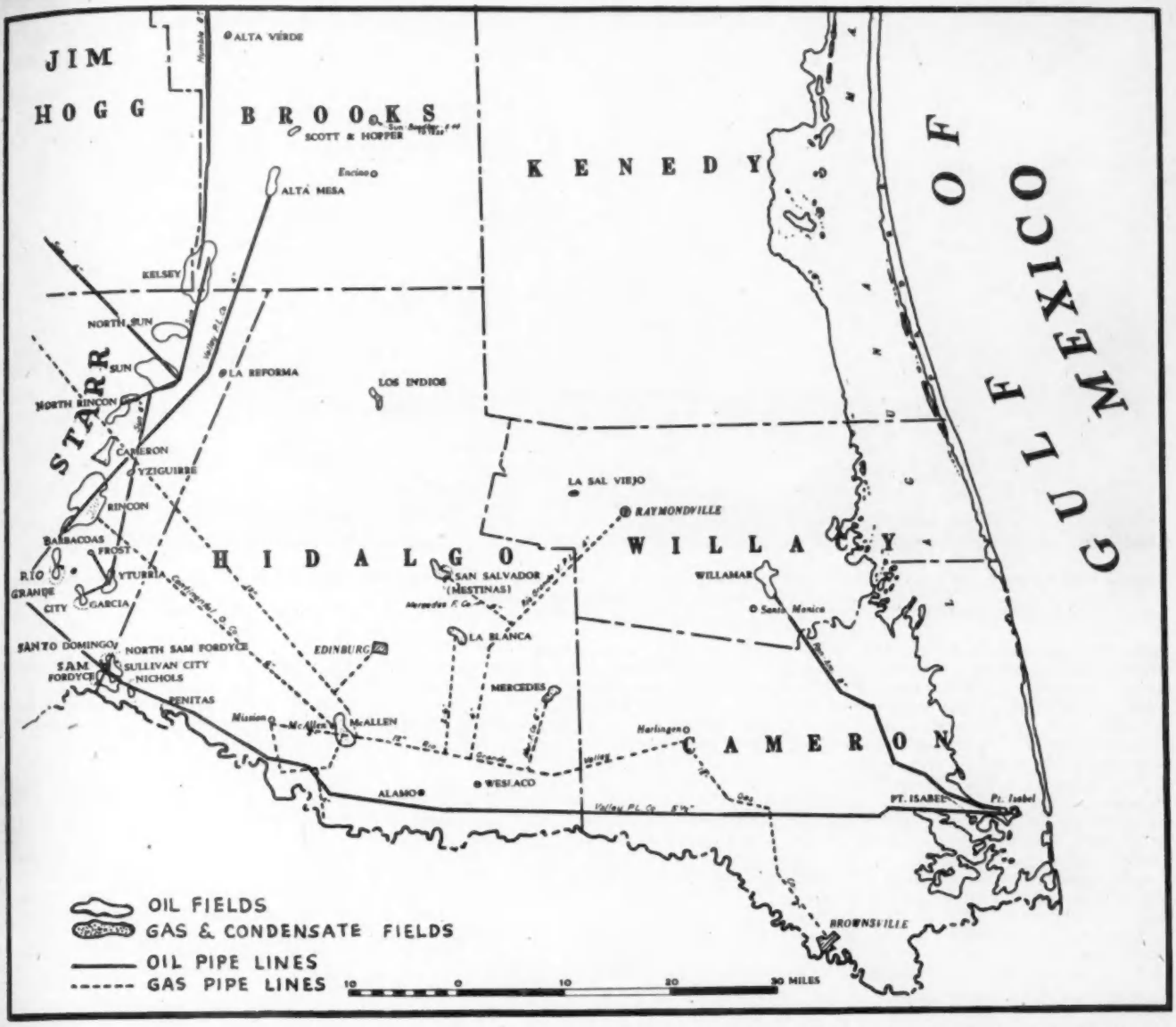
Investigation of the completion record of the discovery well, Pan American Production Company, Shell Oil Corporation, and Standard Oil Company of Texas' Willamar Community 1, shows the well might have been abandoned without ever having recovered as much as a barrel of oil but for the curiosity of men in charge of operations who sought an answer to the question of why sand at 7600 feet should carry water which was definitely brackish but was not oil-field brine. The section now producing was never cored and showed no oil on initial tests.

The field is 20 miles southeast of Raymondville, in Willacy County, and from present development, coupled with subsurface and geophysical data, should cover a producing area of at least 10,000 acres, on an anticlinal structure. Production is from the upper 200 feet of the Frio. Sand section varies, but over a large portion of the field, the oil section consists of 100 to 110 feet of alternating sands and shales, containing as high as 50 to 60 feet of effective oil sand with gas-oil contact at 7845 feet and oil-water contact not constant, but about 7954 feet. These are actual depths, not sub-sea datum, there being almost no surface relief in the area. Most of the sands, being shaley and fine-grained with much lower permeabilities than ordinarily associated with the Frio on the Gulf Coast, will not have the high recovery factors usually applied to this section, but re-



Pan American Production Company et al's A. B. Crane 1 will explore deep Frio section to 12,000 feet.

Portion of camp area showing Pan American Production Company's office and warehouse, tool platform with connected oil house, garage and a small part of the pipe racks. Camp dwellings in left background. Standard Oil Company of Kansas office and dwellings in right background.



Regional map showing location of Willamar field and pipe line. (Portion of District 4 oil and gas map by Commercial Drafting Service, Houston)

serve in the presently discovered and producing sands will probably run more than 70,000,000 barrels.

There were 56 producing wells at the end of September, 10 rigs running, and only one dry hole has been drilled. This was a well by Sun Oil Company on the extreme southeast side of the field which found top of the oil sand above water level, but found sand too hard and tight to produce commercially.

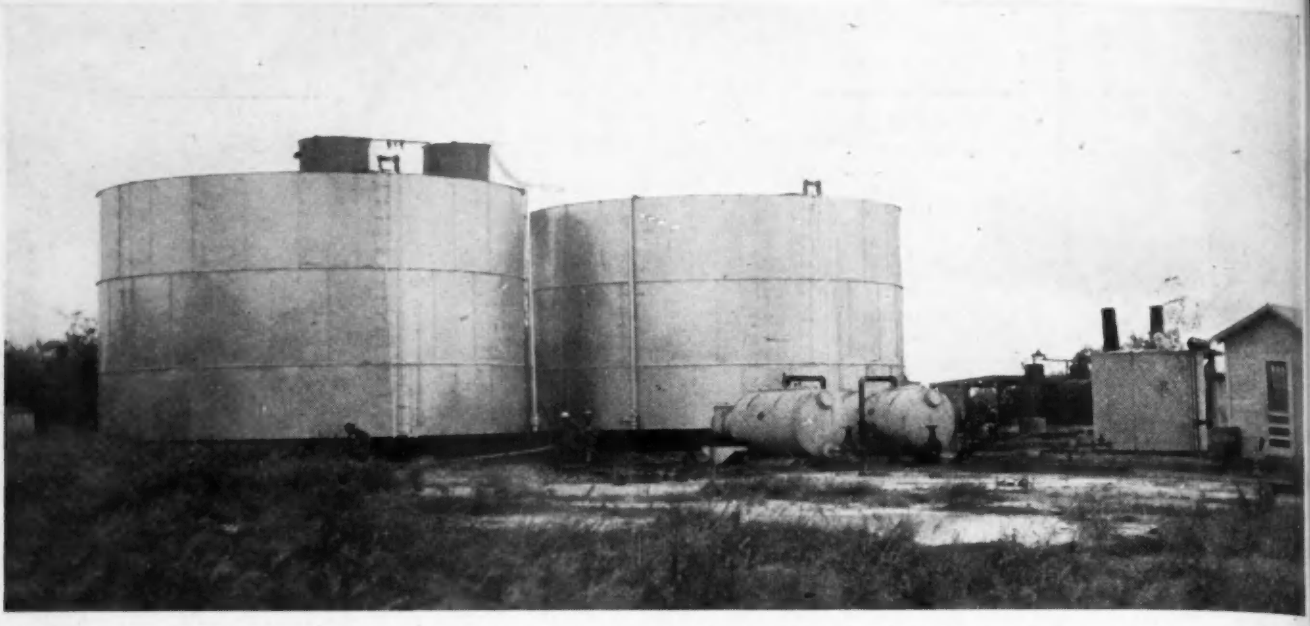
Shell Oil Corporation, together with Standard Oil Company of Texas, worked out the structure with reflection seismograph in 1935, purchasing considerable acreage immediately and adding more later. Pan American bought its 100-percent acreage in 1937. In the fall of 1940, a deal was worked out whereby Pan American acquired an undivided 37½-percent interest and operating control in the 6200-acre lease block owned by the other two companies, which was in addition to the 2100 acres owned wholly by Pan American, and started drilling the first well, Community 1, on partnership acreage. It was drilled to 9002 feet and finally completed on November 18, 1940, making 288 barrels of 30-gravity oil daily through a 3-16-inch choke from perforations at 7620-78 feet to open the first crude oil production for Willacy County.

One More Swab

Under agreement with the partners, coring was not started until below the depth of the present field pay and sands below the depth of the present field pay and sands below 7800 feet showed salt water, casing being set all the way through the upper sands. When testing was started at bottom, working back up the hole, salt water was recovered at all points indicated by coring and by electric log. At the level now producing, the test showed brackish water instead of salt water. Operators presumed the brackish surface water used in drilling had been forced back into the sand by the repeated squeeze jobs, and left the testing tool open while swabbing through tubing in an effort to make the well definitely show either brine or oil. After swabbing steadily through two 12-hour tours, still recovering brackish water, operators were ready to abandon the hole, but decided to swab one more tour in a final effort to make the well show salt water. Toward the end of the next 12 hours it started showing a trace of oil which increased as swabbing was continued, until finally it was making pipe-line oil, shortly after which it kicked off and started flowing under its own power. Strangely enough, further completions have almost all been normal. Usually it is not necessary to swab at all, since wells start flowing after being washed a short time.

In succession, over a period of months, Pan American drilled Kent 1, extending production 2½ miles west-northwest, Burgess 1 a mile south-easterly from Kent 1, and Theodora Garcia 1, 3000 feet southwest of the Burgess well, as extensions to prove up an area 3 miles east and west by 2 miles north and south. This was in early April of 1942. The field was extended another ¾ mile by Rodriguez 1 in September. Most of this time no interior development was in progress.

Early transportation was all by trucks but later a tank car outlet was established for a limited amount of the crude, low in gasoline content, through contract with Coastal Refineries at Port Isabel. Development was slow during this time of limited demand. The more substantial market was established in 1943 when the high heater oil and kero-



Water-treating plant, showing 5000-barrel settling tanks, heaters in foreground and chemical tanks on towers in background. Testing laboratory is in small building at extreme right.

sene content made it desirable if delivered to the proper refineries in sufficient quantities. This factor, coupled with a two-mile southward extension of the field by Baldridge & King in August, touched off the spirited drilling campaign which is still in progress.

To support this campaign, Pan American Pipe Line Company has constructed an outlet direct to Port Isabel, an 8-inch line with capacity of 12,000 barrels daily, sufficient to take care of production by all operators in the field. The crude is loaded on tankers for water transportation to refinery centers.

The drilling program involves Pan American, both on partnership and wholly owned acreage, Baldridge & King, Standard Oil Company of Kansas, Sun Oil Company, and Humble Oil & Refining Company, which has established production on the King Ranch property adjoining the field on the north. During the height of the program 12 rigs were running continuously.

Principal difficulty in field development is availability of water. Surface water is used exclusively, since the water from shallow wells is much too high in mineral content and cannot be used even after treatment. The surface water itself was found to be unsatisfactory by early contractors in the field, causing excessive depositon of scale in lines and boilers. Contractors were reluctant to take jobs in the field for this reason, and it has been necessary to install a water-treating plant for processing surface water. The installation is a conventional type treating plant, using soda, ash, and lime for the principal reagents, with a small amount of caustic and sodium aluminate. Two 10,000-barrel settling tanks have been provided, and as long as there is a sufficient surface supply the original objections have been eliminated. However, even now there are recurrent shutdowns due to lack of water supply.

Drilling rigs used in the field are conventional steam rotary rigs with some portable rigs with jackknife derricks used in final completion of wells drilled with the steam rigs. Normal drilling conditions prevail with considerable rock-bit drilling of hard shales in the northern part of the area, wells being drilled to a depth of 8000 to 8035 feet and completed in 40 to 45 days at a cost of about $65,000. Casing program calls for slightly over 1500 feet of 10¾-inch surface pipe with a 7-inch or 5½-inch oil string cemented or bottom and perforated throughout the entire oil-bearing section after squeezing to isolate it from upper gas and bottom-hole water. Wells are being completed "barefooted," the firm, tight sands making use of screen unnecessary. The sand conditions also account for the practice of perforating the entire section, low permeabilities making it desirable to open as much sand as possible to production. With only one producing section opened to date there are no dual completions.

No Salt Water Problem

Thus far there have been no salt water disposal problems, most wells making pipe line oil, and therefore there is no lease treatment needed to obtain pipe line oil for the transportation facilities. Conventional lease tank batteries are used, with a separator and high 500-barrel bolted steel tanks. Completion gas-oil ratios are low, usually around 500 to 1, although they may run as low as 200 or as high as 700 to 1.

The field is being developed on a staggered 40-acre pattern, so spaced as to allow drilling to 20-acre spacing if future performance of the producing formations justifies closer spacing. According to present estimates, another 200 wells will be required to complete field development on the 40-acre pattern. Proration is based 75 percent on acreage and 25 percent per-well. The area will be subject to 7 shutdown days during October, so the net allowable per calendar day will be just under 100 barrels per well, or approximately 5600 barrels daily for the field.

With production from sands above 8000 feet, and deepest well yet drilled in the field only going to the 9000-foot level, there have been no real deep tests of the lower Frio in the field. Pan American has started drilling Crane 1, on partnership acreage, scheduled to 12,000 feet, which should throw some light on deep producing possibilities at Willamar.

Recently Sun Oil Company drilled its Santa Rosa 1, as an 11,520-foot wildcat seven miles west of Willamar, and found sandy section all the way to the bottom of the hole where it was 4600 feet into the Frio section. In the event sand conditons are similar in the field, there might be possibilites of deeper production here. The sands between 8000 and 9000 feet have been found to be very hard and tight, with showings not commercial in value.

Trinity Drilling Company was contractor on the discovery well. Tom Graham, Fain Drilling Company, Loffland Brothers, and Allen & Morris have operated in this field for Pan American. Graham now has a 50-well contract with Pan American. Sun Oil Company has used Fain Drilling Company as contractor, and Standard of Kansas has used Doug Corgey and Dillard & Waltermire. Humble, Bridwell, Baldridge & King, and Lyons & Prentiss have used company rigs.

Pan American and Standard of Kansas each has constructed modern, permanent camps and office buildings in the field in anticipation of the continued intensive drilling and operational program.

The pipe line to Port Isabel has now been placed in operation. Two 25,000-barrel tanks have been erected in the field, and pending completion of the permanent pumping station, equipment consisting of reciprocating pumps and automotive type prime movers has been set up to handle temporarily the entire field output through the main line. Deliveries to tankers at Port Isabel have already been made.

Posted price for Willamar crude at the well is 98.46 cents per barrel. Gathering charge is 5 cents, main-line tariff 7½ cents, handling and loading charge at Port Isabel is 1½ cents, and an additional ⅓ cent per barrel is charged for dock usage at the port.

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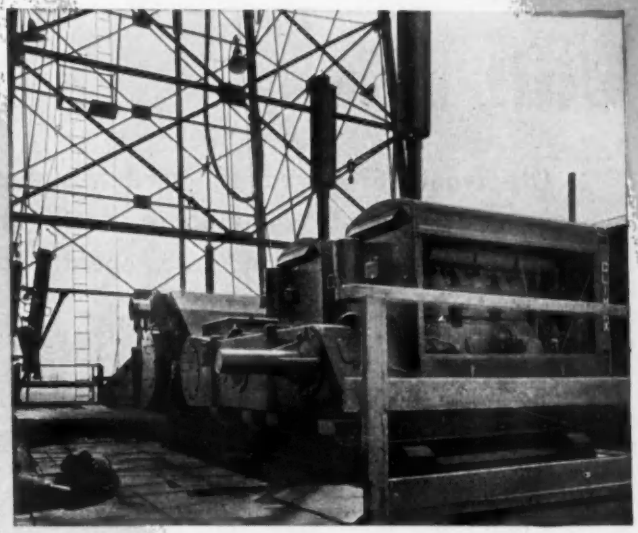

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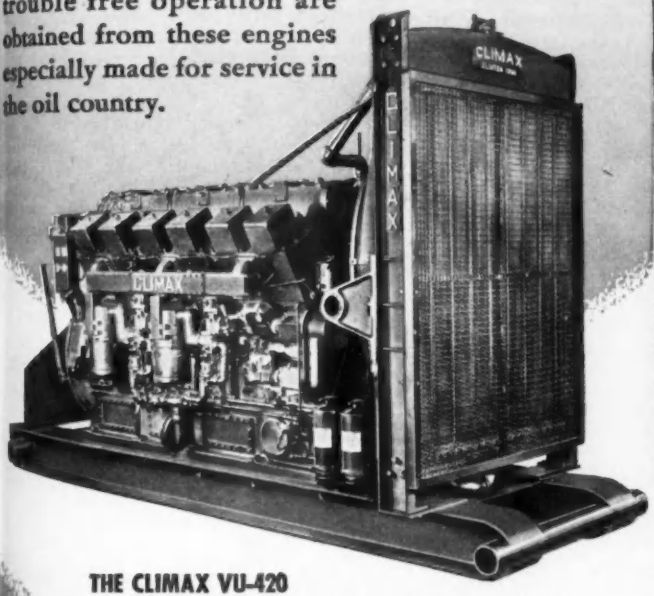

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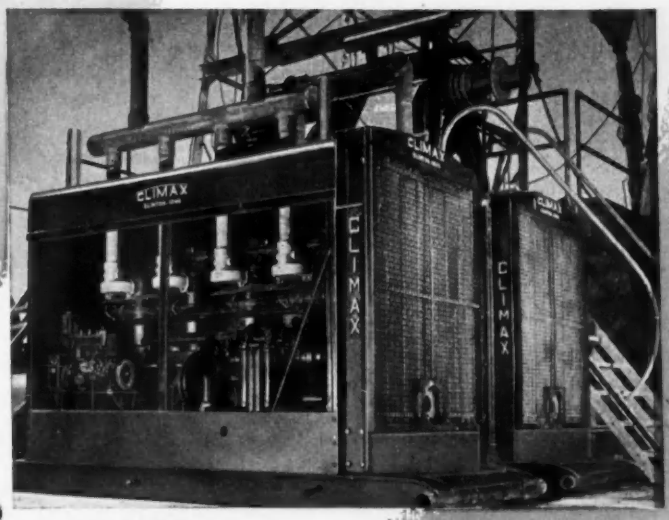

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Proper Construction Adds to Compressor Unit Life

Observance of correct fundamentals should decrease installation and maintenance costs of permanent design plants and increase operational efficiency

WITH secondary recovery, re-cycling, pressure maintenance and other methods of increasing oil recovery through the media of injecting compressed gas or air into a reservoir assuming increasing importance to oil producers, it seems certain many operators who have had no previous experience in plant construction may be installing compressor units.

To these operators primarily the following general fundamentals of plant construction are offered. Observance of them, or application of associated features, should decrease installation and maintenance costs of permanent design plants and increase operational efficiency and life. Details of design and construction are not covered but merely the more important construction features.

Concrete Mixture

The concrete mixture to use in compressor foundations, footings, walls and floor should be carefully controlled. Concrete is a mixture of water, sand, stone, and cement, with the constituents forming a solid mass by the cement paste filling the void space between the aggregates. The amount of each to be used should therefore be properly proportioned to get a good sizing of materials.

Aggregate is divided into two classifications. Coarse aggregate is that which will be retained on a ¼-inch mesh sieve and consists of crushed stone or gravel. It should be properly graded in size and free from clay and dirt. The sand, or fine aggregate, should also be graded in size and free from impurities.

Fresh water should be used for concrete and should not contain appreciable amounts of mineral impurities. The amount of water to be used is very important and should be carefully controlled. Otherwise the water-cement ratio will increase to a point that a lean, low strength mixture will result. As a rule 2500 pounds per square inch tensile strength concrete is satisfactory for field use and may be obtained by mixing 1 sack of cement, 2 cubic feet of sand, and 4 cubic feet of gravel, or stone, with about 6 gallons of water. Thorough mixing before adding water is desirable. After being placed in forms the concrete should be kept damp and undisturbed for at least 24 hours to prevent too rapid curing and development of cracks or hair checks.

Unless the plant is being built on solid rock the first concrete usually poured in a permanent design station or plant is the compressor foundation mat. This affords footing for compressor foundations and prevents transmission of horizontal vibrations caused by compressor operation.

The mat should be thick enough to withstand vibration and weight and should extend nearly to, but never under, the building foundations. Keyways should be left in the top of the mat to tie in compressor foundations, and the bottom or tensile side should be well reinforced. If the plant is being built on unstable ground piling should be driven until satisfactory strata are penetrated. The piling should slope towards the center of the mat and be keyed to it with reinforcing steel.

After the mat has cured the keyways should be thoroughly cleaned before the foundation is poured. Foundations are usually made in the form of an inverted "T," with the shelf or step, thus formed serving as a support for floor beams or the floor itself.

Spacing Bolts

Bolts for the compressor tie down should be carefully spaced in a piece of pipe in the foundation form while concrete is being poured. By so doing the bolts will be inside the concrete free pipe and free to be moved laterally at the top while the compressor or engine is being lowered in place. This insures a proper fit of the bolts with bed plate openings. When setting the compressor down over these bolts there should be a few spacing blocks of wood, or wedges placed around the foundation top. After the compressor is thoroughly aligned and leveled the tie bolts should be tightened and the bed plate grouted in place. The leveling wedges may or may not then be removed after the grouting has set.

Necessary piping and ducts should, of course, be placed and tested before concrete is poured. After the mat and foundations are poured and mechanical equipment is set and aligned, the floor should be poured. A strip of insulating material should be placed between the edge of the floor and all foundations to prevent vibration transmission.

In the design of piping it is important to remember that the suction and discharge lines should be capable of handling the compressor volume. This means a compressor rated at 100,000 feet per day should have connecting piping capable of handling 100,000 feet in the actual time during a 24-hour running period that the suction valves are open. The compressor takes in gas in cycles and not in steady flow, and unless the piping is designed on this basis the unit will not operate efficiently.

Undersize piping results in lowering of compressor efficiency since the volume a compressor is capable of handling cannot enter the cylinders during the time the valves are open. A lowering of station capacity will certainly be evidenced.

Composition and application of cooling water is one of the most important items in plant design and operation. It is important in that dirty, scale-forming, or corrosive water will destroy the cooling system or its effectiveness in a short time, unless properly treated; and also that if circulated at improper rates will create undue strains in cylinders and pistons.

Ward Off Corrosion

Proper composition cooling water contains a pH value of 8 or over, or slightly alkiline, no oil or suspended solids, not too high hardness, no dissolved oxygen or carbon dioxide, and not over 5.5 ppm chloride. The usual types of water treatment are the lime-soda or the zeolite processes, to prevent corrosion, algae growth and scale formation. In addition it is preferable to use a closed type water system.

By treatment, or using good water, the water passages are always clean and offer no restrictions to heat transfer, and by circulating water at rates which keep the differential between intake and discharge temperatures at 20 degrees Fahrenheit or below, no mechanical failures should result due to improper cooling.

Almost of equal importance is the installation of air filters. In territories where the atmosphere is laden with dust this should be strongly emphasized. The results of scouring action afforded by dust and dirt in intake air will be quickly evidenced in re-bore jobs if not effectively filtered out.

In addition to these normal precautions and methods of construction the installation of safety devices should be considered. They are now being installed to prevent or control low oil pressure, abnormal cooling water temperatures, discharge pressures, bearing over-heating, engine over-speed, capacity and discharge pressure of compressor, and offers safety in operation which could not be otherwise achieved without constant supervision.

Oklahoma Abandonments

Eighty-two exhausted oil and gas wells were abandoned in Oklahoma in the period between August 21 and September 23, according to a report by the Oklahoma Corporation Commission. Of this number 76 were in the east ranges and six in the west ranges. During the same period 46 wells drilled were failures of which 38 were in the east ranges and 8 in the west ranges.

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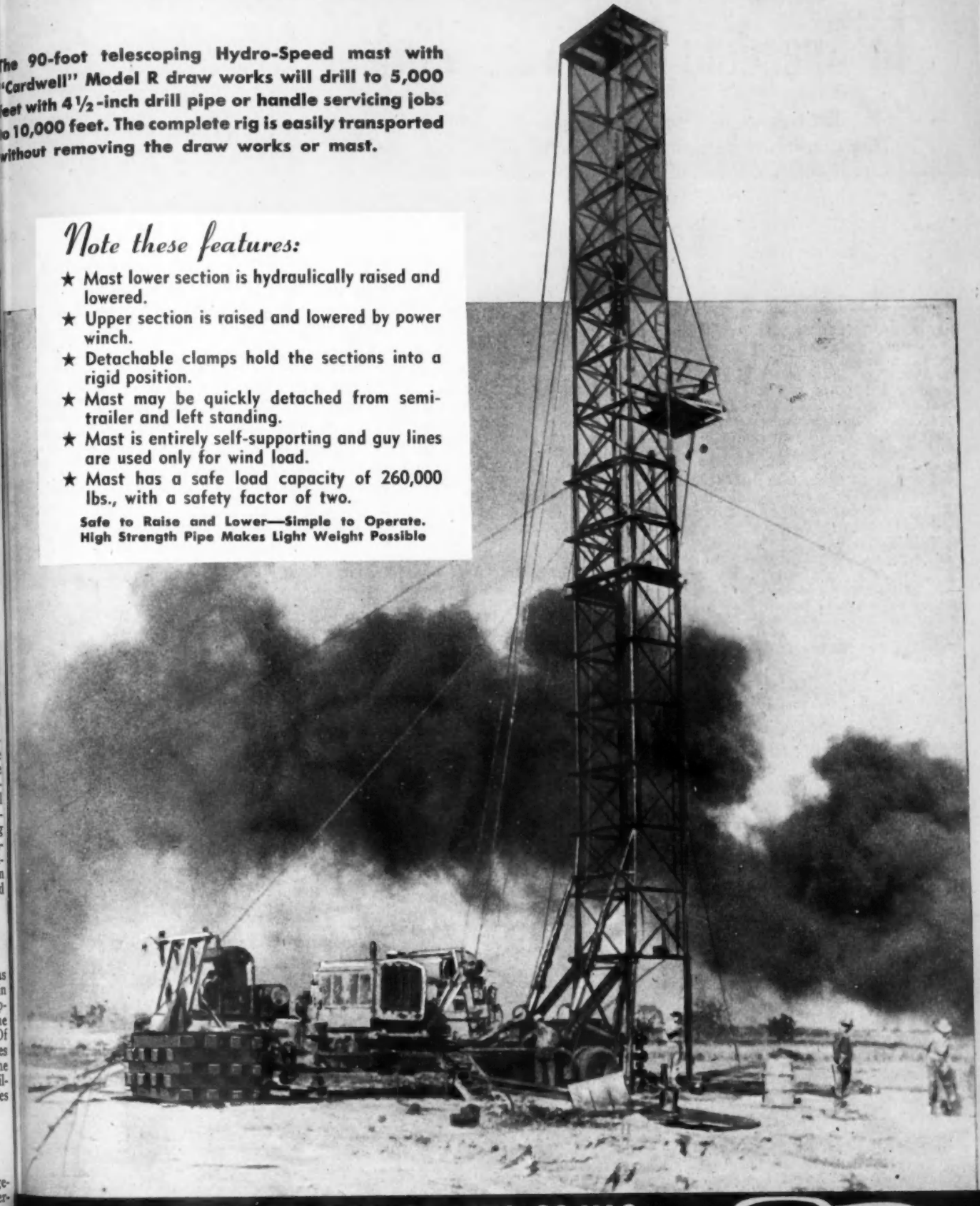

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Arc Welding's Important Role In Speeding Pipe Line Work

Possibilities of making better time and improving the quality of deposited weld metal are discussed

By H. O. WESTENDARP, JR.
Electric Welding Division, General Electric Company
Schenectady, New York

THE speed with which long-distance pipe lines have been constructed has been an important factor in war production. As in other industries, arc welding has played an important part. Not only has the welding process speeded production and improved the quality and the strength of the pipe line, but it has also indirectly contributed many important benefits. For example, the elimination of heavy flanges at joints saves weight and simplifies the application of protective coatings and wrappings to the line.

This article proposes to outline the welding procedure now being used and to point out what may prove to be possibilities for further increasing the welding speed and improving the quality of the deposited weld metal.

Type of Welding Equipment

Cross-country pipe lines must necessarily go through virgin territory, in many places inaccessible to electric power. Therefore, the electric energy for the arc is provided by gasoline engine-driven welding sets. They must operate rain or shine, over rough terrain as well as smooth, and are built accordingly. The severe outdoor service conditions have been met by these equipments, which are usually of 200 or 300-ampere rating, or, on the larger lines, of 300 or 400-ampere rating.

There are two general welding procedures used in the construction of long distance pipe lines.

1. Roll welding, sometimes referred to as "firing line welding," which is done in the downhand positon only.

2. Stove-pipe or bell-hole welding, which involves welding in all three positions, flat, vertical, and overhead.

Roll welding requires an operator, a helper to rotate the pipe, and an inspector to check the welding. More than one operator can be used, if available, and it is desirable to weld two or more joints simultaneously in order to speed work.

The procedure is to align three or four lengths of pipe on dollies, tack-weld them into a section, then have the helper rotate the whole section gradually as the weld is made. AWS Class E6010 electrodes are used. The operator strikes the arc at or near the top of the pipe and simply maintains it as the section is rotated, pausing only to replace the consumed electrode. The angle of the electrode is maintained at approximately 90 degrees with a tangent to point of welding. Slag is thoroughly cleaned between all passes.

The inspector's job is made somewhat easier by the roll welding method, since he can inspect the first weld while the operator is making the second weld, and so on until the section is completely fabricated. (Where all the joints in a given section are welded simultaneously, the inspector must wait for welding to be completed on each pass before inspection can be made.)

Stove-pipe welding, however, requires that the inspector get underneath the pipe to inspect welding on the bottom, which is somewhat more difficult.

After completion, each roll-welded section is tied into the line by a stove-pipe or bell-hole weld.

Advantages of Roll Welding

The advantages of the roll-welding method are as follows:

1. It permits use of large diameter electrodes having high deposition rates.
2. It permits easier welding in the flat positon.
3. It permits sounder and more uniform welds around the entire circumference of the joint.

The size of welding electrodes, number of passes, welding speeds, etc., are subject to a number of variables such as size of pipe, rating of welding equipment available, etc. Table I indicates increased welding speeds made possible by use of large diameter electrodes, provided welding equipment of sufficient rating is available.

The principal limitations of roll welding are space requirements needed for auxiliary equipment such as dollies, tractors, etc., that must be available to set up a complete section. Welding generators of high amperage ratings must be available for roll welding. Since most long distance pipe lines go through many sections of the country where the nature of the terrain is such that maximum overall speed, including clearing of right-of-way, excavations, etc., can be obtained only by a very narrow right-of-way, it is obvious that the application of roll welding is, therefore, limited accordingly. It is difficult to set up three or four lengths of pipe on dollies for roll welding, in extremely rough country crossed by valleys, ditches, etc. Over-all progress of the pipe line is the objective of the contractor, and he determines the method of welding accordingly. (*Since roll welding requires the stove-piping or bell-hole welding of contiguous sections of pipe connected by roll-welding, the method should perhaps more accurately be considered an adjunct to stove-pipe or bell-hole welding, the roll welding being used to connect two or more mill lengths and thus to reduce the number of joinings of the other types in a given line.*)

Welding Procedure

Stove pipe welding is the method most commonly used, particularly where the line is going through rough country largely without good roads. These conditions usually mean narrow right-of-way and limited availability of auxiliary equipment. At points where the line comes to road crossings or other similar obstructions, the procedure is to dig a hole around the joint sufficiently large for the welding operators to line up and weld the pipe.

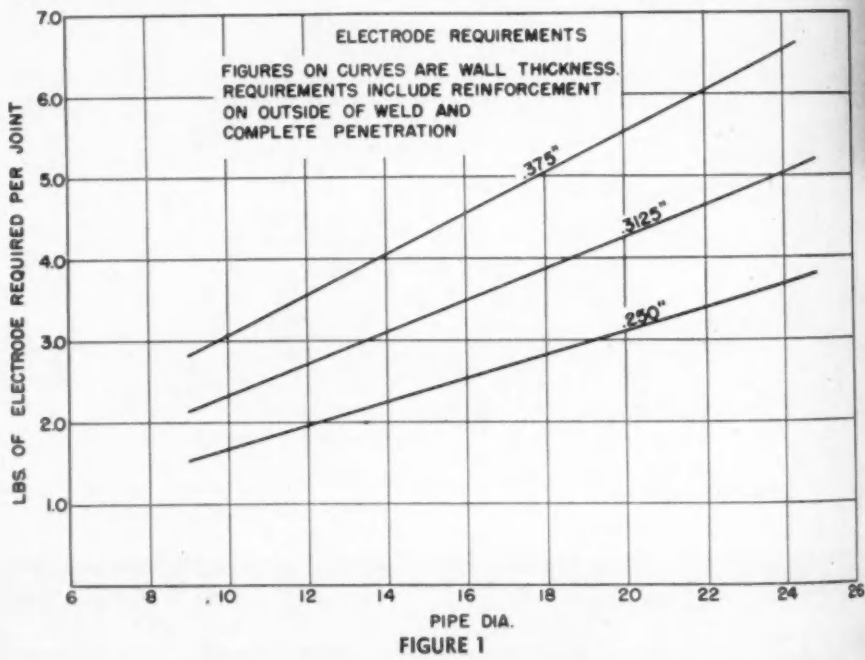
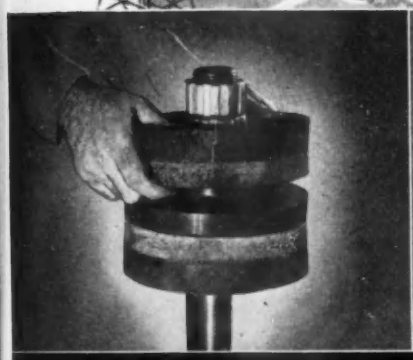
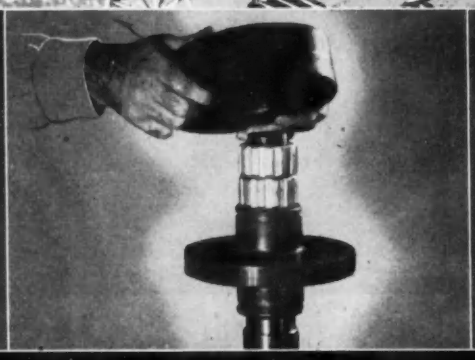


FIGURE 1

"CHANGE THE RUBBERS and SAVE THE PISTON!"



1. When rubbers are worn, you don't have to throw away the entire piston. Simply remove the old rubbers and save the body.



2. It's not even necessary to remove the piston body from the rod. You save on shut-down time when rubbers are changed.

3. NOW new Mission Rubbers are installed and the piston is ready for another long run at much less than the cost of a new piston.

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FIGURE 2
This weld shows good penetration of the stringer bead and sound deposit.

In such cases, the operation is referred to as bell hole welding.

The welding procedure for stove-pipe and bell-hole welds is identical, each requiring welding in all positions. Class E6010 electrodes are used for all passes. The size of electrodes, number of passes, etc., will vary somewhat with the diameter and wall thickness of the pipe. Since this method requires welding in all positions, the maxmum size electrode is limited to 3-16-inch diameter and welding current to 200 amperes. Larger electrodes or higher welding currents are not practical as the resultant pool of molten metal would be too large to successfully manipulate in the vertical and overhead positons. Table I indicates deposition rates of electrodes, 5-32 and 3-16-inch diameter.

Typical procedure on a 16-inch diameter, 1-4-inch wall thickness pipe to specifications ASTM-A-139-42 having 30 degree bevel, 1-16-inch root face, and 1-8-inch root spacing at joint is as follows:

1. Pipe joint is cleaned of rust, scale, etc.

2. Pipe is lined up concentrically with assistance of specially designed pipe clamps. These clamps have fingers which are secured to the end of the line. The new length is then stabbed into the open end of the pipe clamp.

3. Pipe joint is spaced about 1-16 to 1-8 inch, depending on size of pipe. (Spacing is usually even around the pipe, although some operators prefer to make a slightly wider space at the bottom of the pipe to take care of a tendency for the joint to close up as welding progresses from the top of the pipe downward.) Clamp is closed.

4. Pipe is tack welded in six places evenly spaced around the circumference.

5. Pipe clamp is removed.

6. Pipe is then arc welded as follows:

In either stove-pipe or bell-hole welding two operators are usually employed. The technique consists of starting the arc at the top, or 12 o'clock position of the pipe and welding downward to the bottom or 6 o'clock position.

TABLE 1

A.W.S. Class	Electrode Diameter	Electrode Deposition Rate in Lb./Hr. 150 Amps.	200 Amps.	250 Amps.	300 Amps.	350 Amps.
E-6010	5/32-inch	2.8	3.5	..	..	..
E-6010	3/16-inch	3.0	4.2	..	..	..
E-6010	1/4-inch	..	4.9	5.5	5.8	..
E-6010	5/16-inch	..	..	..	7.6	8.0

Note:—Maximum current for roll welding is limited to 350 amperes. Above this value, porosity and spatter increase rapidly and if the slightest magnetic action is encountered, the Class E-6010 electrode arc becomes difficult to handle.

Maximum current for stove-pipe welding is approximately 200 amperes for stringer bead with 5/32-inch diameter electrode, and 185 to 190 amperes for all other passes with 3/16-inch diameter electrode.

Stringer Bead

The first bead is known as the stringer bead, and is the most important. A 5-32-inch diameter electrode is used at approximately 190 amperes. It is imperative that full penetration is obtained uniformly around the complete circumference of the pipe. As a matter of fact, when welding the stringer bead the welding is done as much on the inside as on the outside of the pipe. The tip of the electrode arcs to either side of the joint uniformly under the manipulation of the welding operator, with a result that a uniform reinforcement of about 1-16 inch is built up on the inside of the pipe around the complete circumference. Failure to get full penetration will almost invariably result in failure of the joint in an operator-qualification test (pull test or root-bend test).

Due to the technique used in making the stringer bead (where light from the arc is partially shielded by the pipe) welding operators usually require a No. 8 lens in the welding helmet in order that sufficient vision may be obtained. There are usually certain operators assigned especially to the stringer bead operation.

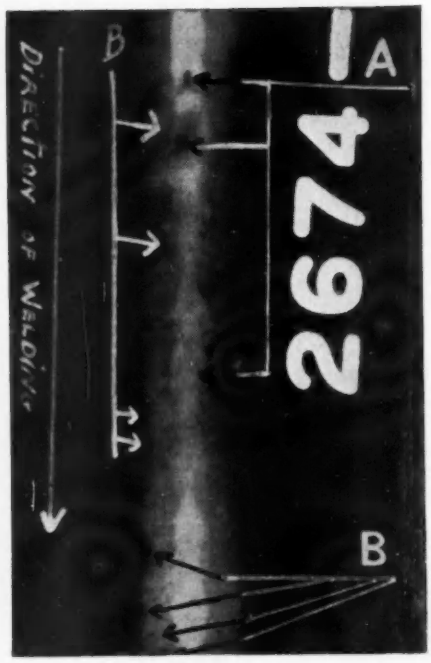


FIGURE 3
This weld shows: A, incomplete penertation of the stringer bead and B, porosity.

The electrode angle in welding the stringer bead is approximately 90 degrees with a tangent to point of welding in direction of travel, but the operator will sway the electrode from side to side at right angles to direction of travel, keeping the tip of the electrode always in the joint in order to direct the arc in such a way as to secure uniform deposit on each side of the pipe joint inside the pipe; in other words, a uniform inside reinforcement. As the second half of each pass is completed, a slight overlap of approximately 1-4 inch is made at the bottom of the pipe. Slag is thoroughly removed.

Second Pass

A 3-16-inch diameter electrode is used at approximately 185 amperes. The arc is struck at 12 o'clock position and progressed downward to 6 o'clock first on one side and then the other. (Two operators are usually used, welding simultaneously.) It will be noted that arc welding current is slightly lower on the second pass even though a larger diameter electrode is used. The machine setting is the same as used for the stringer bead and a slightly longer arc is held in making the second pass, which results in a slight reduction in welding current. A very slight weaving motion (crossways to direciton of travel) is employed in making the second pass, but the angle of electrode is maintained at approximately 90 degrees with a tangent to point of welding in direction of travel and also to a line drawn longitudinally through the center of the pipe.

It should be noted that when the operator reaches the 10 o'clock and the 2 o'clock positons in progressing the arc downward on each side of the pipe, he is compelled to speed up the rate of travel of the electrode in order to keep ahead of the slag in this position. This increased rate of speed is necessary until the 8 o'clock and the 4 o'clock positions are reached on each

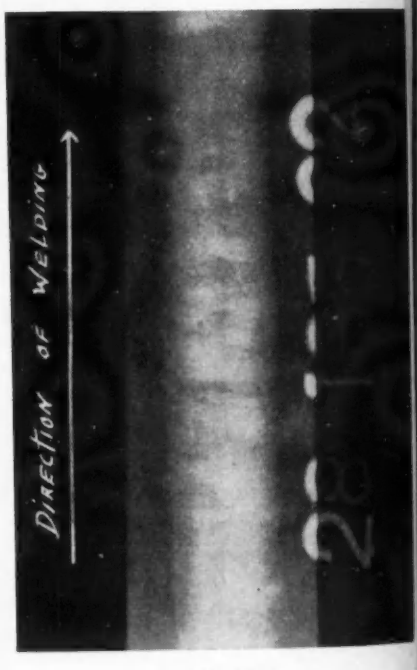
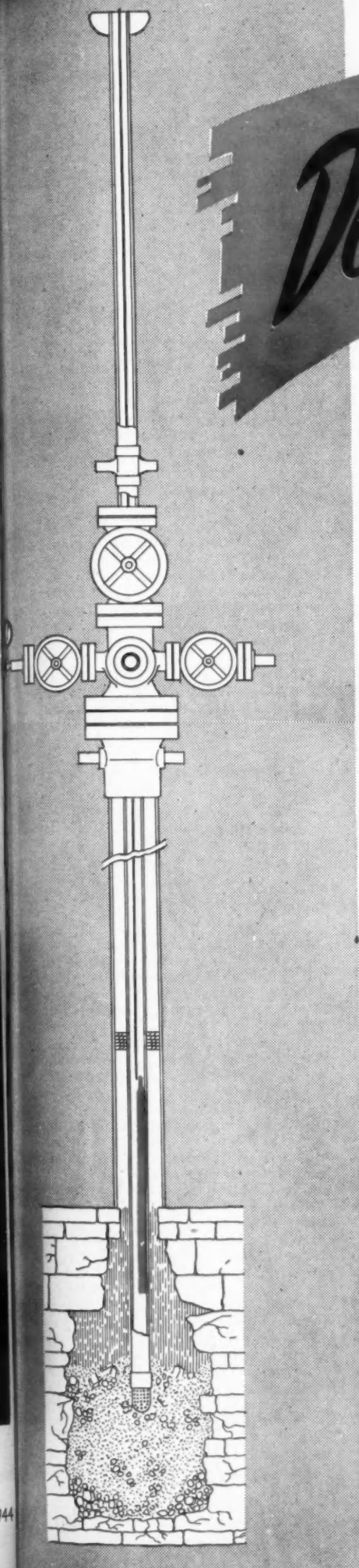


FIGURE 4
A perfect weld.



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side, at which point the operator can again slow down the rate of travel of the electrode around the joint, since from the 8 o'clock to the 6 o'clock or from the 4 o'clock to the 6 o'clock position weldnig is done more in an overhead than in a vertical position. As a result of the increased rate of speed on the sides of the pipe, where welding is practically in the vertical positon, the build-up of deposited metal in the joint is not as great as on the top and bottom of the pipe. It is therefore necessary to build up this section of the weld on both sides of the pipe, so a uniform depth of deposit will be obtained around the complete periphery of the joint.

This operation is called "stripping the sides," and is accomplished with a 3-16-inch diameter electrode welding from the 10 to 8 and the 2 to 4 o'clock positions using same heat setting (185 amperes) and about a 3-16-inch weave. The same angle of electrode is used as for the second pass.

Third Pass

A 3-16-inch diameter electrode is used for the third pass. Some operators prefer reducing heat to approximately 180 amperes, welding from top down and holding the electrode angle as in the second pass, but weaving approximately 5-16 inch. The reduction in heat combined with increased weave permits the operator to maintain a practically uniform speed of travel even through the 10 to 8 and the 2 to 4 o'clock positons. The weaving motion slows the forward rate of travel and keeps the pool of metal under the arc liquid long enough to permit gas to escape and to reduce or avoid pinholing of deposit.

Slag is thoroughly removed and the joint cleaned between all passes.

Summary of welding conditions of all passes is as indicated below.

PASS	Diameter Electrode	Amps.	Weave
Stringer	1/2-inch	190	0
2nd Pass	3/16-inch	185	3/16-inch
Strip Sides	3/16-inch	185	3/16-inch
3rd Pass	3/16-inch	180	3/16-inch

Total arc time all passes—16.5 minutes.
Total time all passes but not including line-up—35 minutes.
The above data apply to a 16-inch diameter, ¼-inch wal. thickness pipe. The number of passes may vary with other pipe sizes or thicknesses.

Operator Qualification Test

All welding operators are required to pass a nipple-welding test to determine their ability. In addition to this, pipe-line inspectors may, at their discretion, require welds to be cut and tested for tensile strength. The qualifications usually required are as follows:

Twelve coupons may be cut from each test weld, four of which will be tested for tensile strength, four for ductility by the bend test, and four for porosity penetration by the nick-break test.

Coupons are tested for tensile strength by a portable testing machine. It is the intent of specifications to produce welds which will develop full tensile strength of the pipe metal. Coupons that break in the pipe metal away from the weld are passed. If, out of four coupons tested, more than one breaks in the weld or the junction of the weld and the parent metal, the welder is disqualified. If only one of the four coupons breaks in the weld and such weld fails to develop minimum tensile strength of the pipe metal, the welder is disqualified. Reinforcement of the weld is left in place during these tensile tests.

The ductility of the weld is determined by a bend test. The coupons are ground or machined to remove the reinforcement inside and outside of the pipe so the cross section in the weld is the same as the pipe. Two coupons are bent with the bead out and two bent with the bead in, placing the weld metal to be tested in tension in each case. The elongation is measured by prick points 5-16 inch on each side of the center of the weld, and on a line at right angles to the weld. The specimens are bent slowly by the free bend method until the first appearance of fracturing. The distance between the prick points is measured after bending, using a flexible scale. The "bead out" bend test shall show at least 20 percent elongation and the "bead in" test approximately 20 percent elongation before fracturing and shall show full penetration.

The nick-break test is made as follows:

Coupons are weakened by nicking them at the weld with hacksaw cuts, then breaking them by applying tension. (Welds must be free of porosity, gas pockets, slag pockets or other nonmetallic inclusions, also pin holes, rivers or other defects). Each coupon shall show not over six gas pockets per square inch of surface exposed in the fracture, and if any gas pocket exceeds 1-16 inch in any dimension, it will be rejected.

Electrode Requirement Data

The data in Figure 1 should be used for estimating purposes only. They include a reasonable allowance for stub end and spatter losses, consistent with outdoor welding.

The present "know how" of pipe line construction is the result of much experimental and production activity. The following comments are made to stimulate interest in what may be possibilities for further improvement.

1. It will be noted (see Table I) that the maximum deposition rate now being obtained is approximately eight pounds per hour from Class E-6010—5-16-inch diameter electrodes at 350 amperes and when using the roll-welding method. This is the maximum current that can be carried by this class of electrode with good arcing characteristics.

A 1-4-inch diameter Class E-6020 electrode can deposit at rate of eight pounds per hour at 350 amperes or 9.5 pounds per hour at 400 amperes. A 5-16-inch diameter Class E-6020 electrode can deposit at rate of 10 pounds per hour at 400 amperes or 11.2 pounds per hour at 450 amperes.

This possibility of increase in speed presupposes two things.

a—Arc welding equipment capable of developing 450 amperes at approximately 40 arc volts.

b—Pipe diameter and wall thickness such that satisfactory welding conditions can be established. The molten pool of E-6020 electrodes is more liquid than E-6010 electrode. However, if if welding is done at a point near but slightly ahead of the top of the pipe in direction of welding, proper solidification should be possible. The stringer bead should be put in with an E-6010 electrode to weld satisfactorily this first pass on spaced joints.

Provided the above conditions can be met, the increase in (arc time) welding speed between electrodes now being used and E-6020 electrodes is in direct proportion to the deposition rate listed above.

An additonal benefit of Class E-6020 electrodes would be as follows:

	As Welded Tensile Strength	Elongation in 2-inch percent
Class E-6010	62,000 pounds	22 percent
Class E-6020	62,000 pounds	25 percent

Use of E-6020 electrodes would therefore result in higher ductility of deposited weld metal.

2. Electrodes designed for arc-welding by the stove-pipe method must have the following characteristics:

a—A forceful penetrating arc.

b—Rapid solidification of deposited weld metal.

These characteristics are necessary to develop good penetration, particularly of stringer bead, and to permit welding in all positions around the pipe. It is also important that gas and other inclusions rise to the surface of the molten pool and escape before solidification, otherwise what is known as pinholing occurs. Pinholing is caused by small particles of gas breaking through the surface of deposit just as it solidifies. A deposit showing surface pinholing may be an indication of porosity in the weld metal itself.

Vertical Down vs. Vertical Up

When welding vertically downward on the sides of the pipe, the operator must advance the electrode at a rate of speed fast enough to keep slag and metal from crowding the tip of the electrode. Otherwise, the arc would be smothered and slag inclusion in deposit would result.

A perfectly straight line motion of the electrode in a vertically downward direction would result in deposited metal being chilled so rapidly that there would be danger of porosity inclusions. To avoid too rapid chilling, the operator usually employs a slight weaving motion of the electrode which keeps the electrode ahead of the arc and slag in the molten pool, but retards the cooling rate, permitting gas to escape.

It should be noted that the vertical down-welding technique constitutes a more difficult problem than vertical upward technique from a standpoint of complete elimination of porosity inclusions (Figures 2, 3, and 4).

Vertical upward technique is employed for high pressure pipe welding, and elsewhere in industry. In this technique, a shelf of deposited weld metal is built up, and the bead is then laid progressively on this shelf in such a way that the deposit cools slowly, permitting more time for gas to escape. However, the vertical down technique is preferred by most pipe-line operators and is considered standard for long distance pipe-line work.

The outstanding construction records of these long lines is evidence of the skill, stamina, and "know how" of the engineers, the contractors, and the welding operators who are building them.

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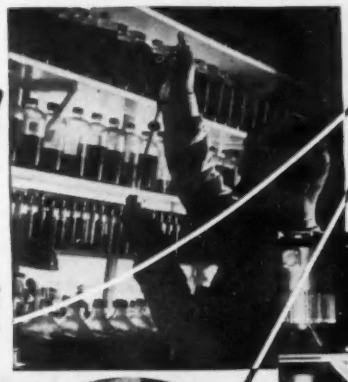

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For Floating Sand—

Sucker Rods Replaced With Small Bore Tubing

Many devices used to help keep sand out of well but the small bore principle appears to be most efficient

By TOM L. TURNER, Staff Writer

SMALL bore tubing is often an efficient answer to the difficulty of floating sand.

These particles from sand stone producing formations mix with the oil which must be raised to the surface for production and the result is scored pumps in both plungers and liners.

Numerous preventives have been used by harassed production superintendents and pumpers, including screens, various types of liners, gravel packing and high-pump levels, but few have always been as successful as the use of small bore tubing instead of sucker rods.

A case in point was a well at which it was impossible to move a pulling machine to the location before the sand settled around the pump, necessitating a stripping job to remove the pump before the well could be cleaned out.

After being cleaned and bailed as nearly dry as possible, two-inch tubing with a joint of slotted pipe as mud anchor was rerun into the hole. A seating nipple was placed on the upper end of the slotted pipe so the pump could be anchored low. This was desirable because the fluid level was approximately at this point. The tubing was landed and swung onto a tubing head of the pack-off stripper type.

Blind Cage Used

Next a small bore pump was run, but instead of using sucker rods to actuate it, 1-inch seamless tubing was attached to the blind cage on the pump. The blind cage, which replaced the regular open cage, was the only feature that differentiated the pump from any of its type. The pump was a metal-to-metal type with a close fit to prevent sand from creeping up along the plunger and between the plunger and pump tube.

Use of the 1-inch tubing eliminated the need of a polish rod but necessitated a polish rod liner. A pumping tee was installed on top of the 2-inch tubing as in the conventional type of pumper well, and the polish rode liner was substituted around the 1-inch tubing in the same manner that it normally would be placed around the polish rod. The 1-inch tubing extended at the top of the polish rod liner and was connected to a 1-inch heavy steel tee resting on a polish rod clamp. The open top of the tee was nippled and capped.

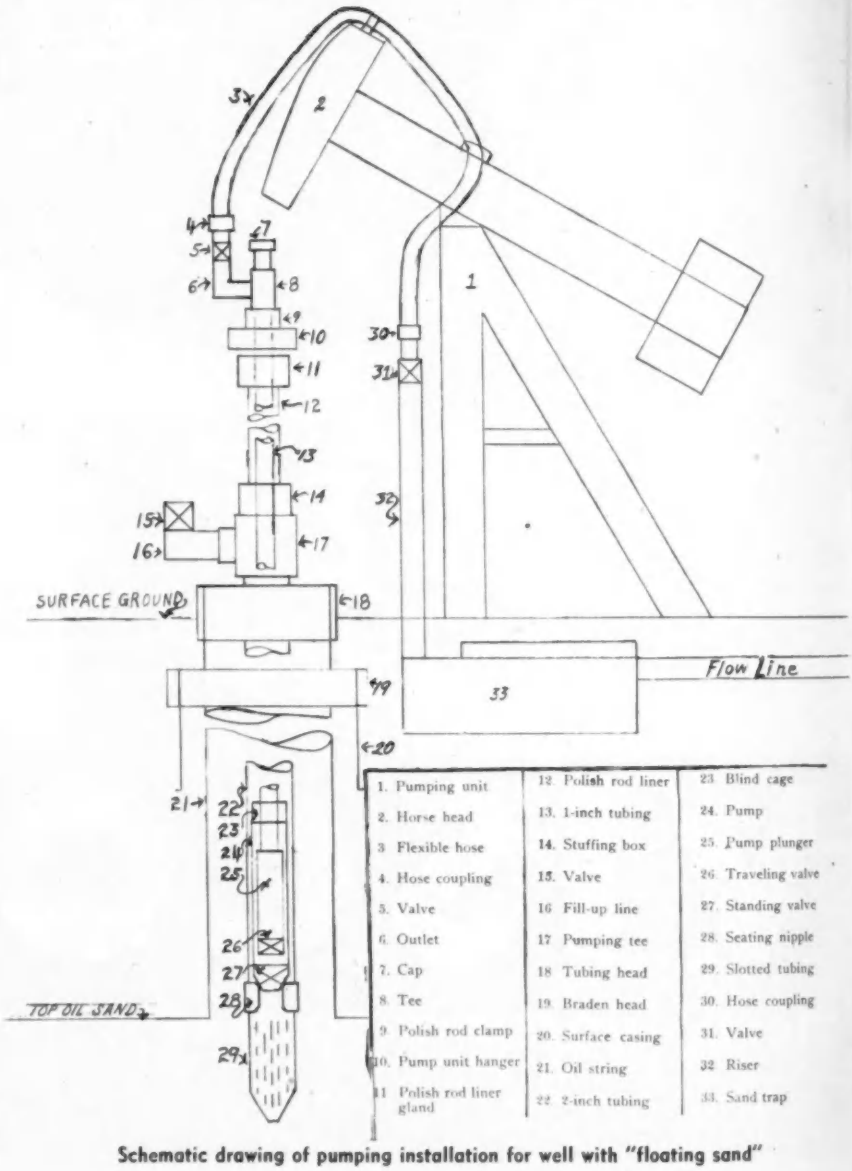
In the conventional type of pumping well the oil is pumped through the annular space between the 2-inch tubing and the sucker rods, then discharged through the pumping tee above the surface into a flow line connection. In this instance, by using 1-inch tubing instead of sucker rods, the oil was pumped through the tubing and discharged through the steel tee at the top of the tubing into a flexible connection. This connection was a length of 1-inch hose attached to the outlet at the top of the small bore tubing, then connected to the horse head of the pumping unit. It followed the horse head down the walking beam to the sampson post, where it left the unit and was attached to a riser coming up from a sand trap that emptied into the flow line discharging into the tank battery.

To prevent collars on the small bore tubing from wearing holes in the 2-inch tubing, a difficulty frequently experienced in this type of pumping, the annular space between the 1-inch and the 2-inch tubing was filled with clean oil, lending buoyancy as well as lubrication.

Pumping Velocity High

The use of small bore tubing along with a small bore pump permits a high velocity of fluid to be maintained, which prevents the settling of sand as happens when the speed of the oil's ascent is relatively low. Slow ascent of the oil in regular size tubing allows sand in the oil to drop back on the pump, eventually covering it to such an extent that the pumping unit can not lift the load. Then the rods part or some other difficulty arises.

A check on this well revealed that the combination pumped approximately 80 percent sand with the oil.



1. Pumping unit	12. Polish rod liner	23. Blind cage
2. Horse head	13. 1-inch tubing	24. Pump
3. Flexible hose	14. Stuffing box	25. Pump plunger
4. Hose coupling	15. Valve	26. Traveling valve
5. Valve	16. Fill-up line	27. Standing valve
6. Outlet	17. Pumping tee	28. Seating nipple
7. Cap	18. Tubing head	29. Slotted tubing
8. Tee	19. Braden head	30. Hose coupling
9. Polish rod clamp	20. Surface casing	31. Valve
10. Pump unit hanger	21. Oil string	32. Riser
11. Polish rod liner gland	22. 2-inch tubing	33. Sand trap

Schematic drawing of pumping installation for well with "floating sand"

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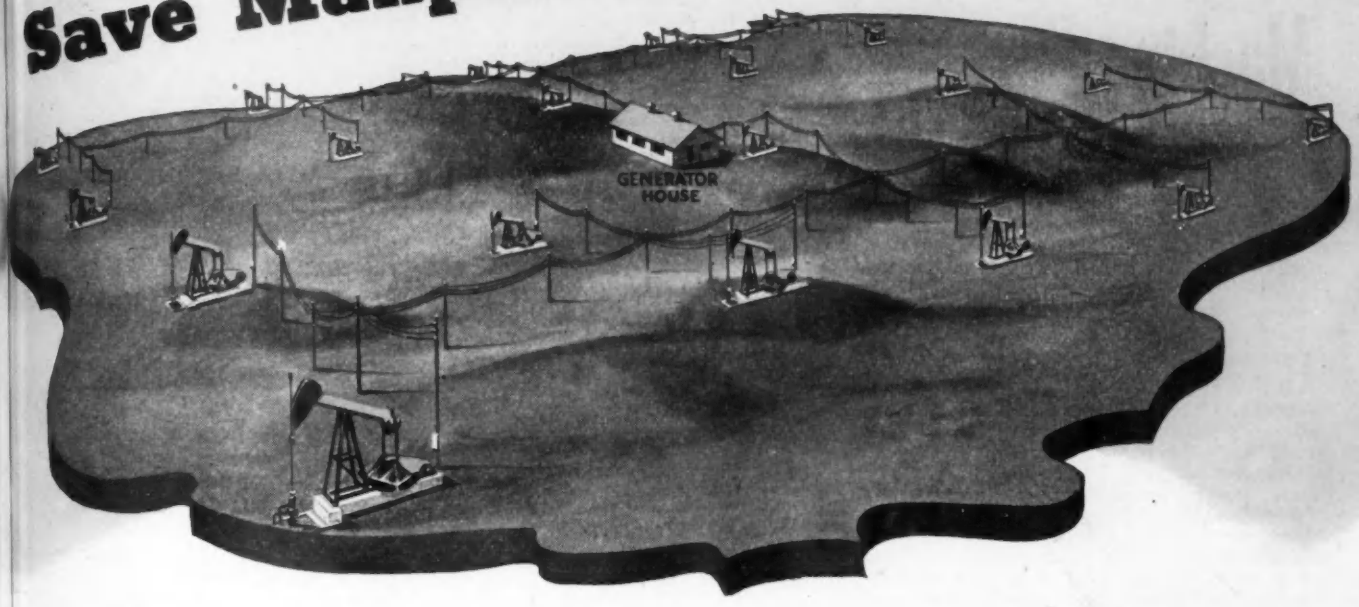

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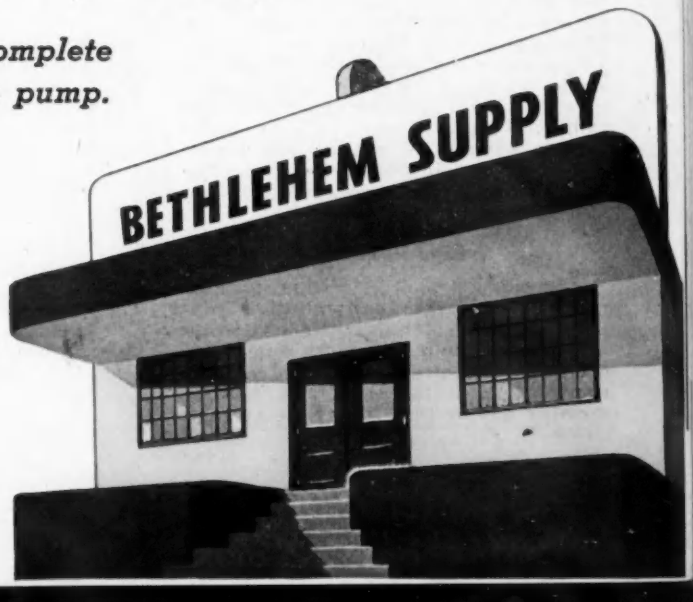

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A Valuable "How" Article—

How to Increase The Life of Machine Parts

PART 3
(Concluded)

By E. N. KEMLER
Professor, Mechanical Engineering
Purdue University

PREVIOUS articles (THE OIL WEEKLY, October 9 and 23) have been primarily concerned with how and why parts fail. There are many remedies which can be applied to the solution of some failure problems. The general tendency when failures occur is to blame it on the material. Where replacements must be made on existing equipment, changing of materials will frequently produce little effect if material only be changed. More can usually be done by modifying the design and with care in heat treatment and machining.

Where fatigue is a problem care should be taken to maintain a smooth surface. Small surface scratches may be sufficient to cause the start of a fatigue crack where the stresses are high. Pipe wrenches should never be used on a highly stressed member. Hammering of the part will likewise result in serious damage. Where such scratches already exist or unavoidably get on the member it is important that they be removed or smoothed out. A shallow sharp scratch is much more severe than a deep scratch with a rounded bottom.

When there is a change in section, whether the member be a torsion tension or complicated loaded member, there will be stress concentration. This can be reduced by the introduction of generous fillets. Figure 1-a shows how not to design the member. Figure 1-b shows a member with a suitable fillet. Where extremely high stresses are encountered the fillet radius should be made as large as possible. In some cases a square shoulder must be maintained to carry thrust, to align parts, etc. In such cases the use of a ring such as shown in Figure 1-c allows the fillet to reduce stress concentration and still give the square shoulder.

Size of Fillet

The size of fillet necessary to give reasonable stress concentration depends on the materials, their heat treatment, condition of surfaces, etc. Theoretically the stress at the edge of a round hole drilled in a falt tension member will be three times the average value. The stress concentration in this case is 3. Figure 2 shows a graph which gives some average values of stress concentration. For a plate for which A=1 inch and B= 2 inches, the size of fillet to keep the stress concentration below 1.8 will be A/R=4 or R—¼ inch.

In some machine elements such as threaded members the shape and function of the member is such that the member cannot be provided with sufficient fillet to keep the stress concentration down. Threaded members often come in this classification. Where the load must be carried directly by the threaded member, changing of the thread profile may be desirable. Figure 3 shows a standard thread profile. The API drill pipe and casing thread as shown in Figure 4 has a rounded profile and is therefore better insofar as strength is concerned. Practically the sharp thread may approach the same form as the round thread when the chasers get drill. Figure 5 shows such a case. Care must also be taken in threading to provide good cutting tools. When a poor threading job is done, tearing of the metal as shown in Figure 6 can be the cause of failure when subjected to fatigue loading conditions.

When members are threaded to take a nut or other member for carrying a load, the section is weakened if done as indicated in Figure 7-a. This weakening occurs because the net section which must carry the load is reduced by the amount of thread cut out. For this reason fine threads are used where strength is necessary. The threads must of course have sufficient size to carry the shear and compressive loads. Wherever possible the construction

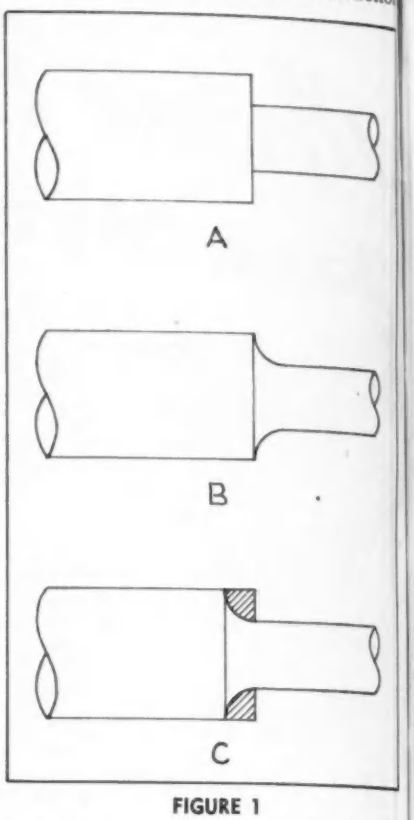

FIGURE 1

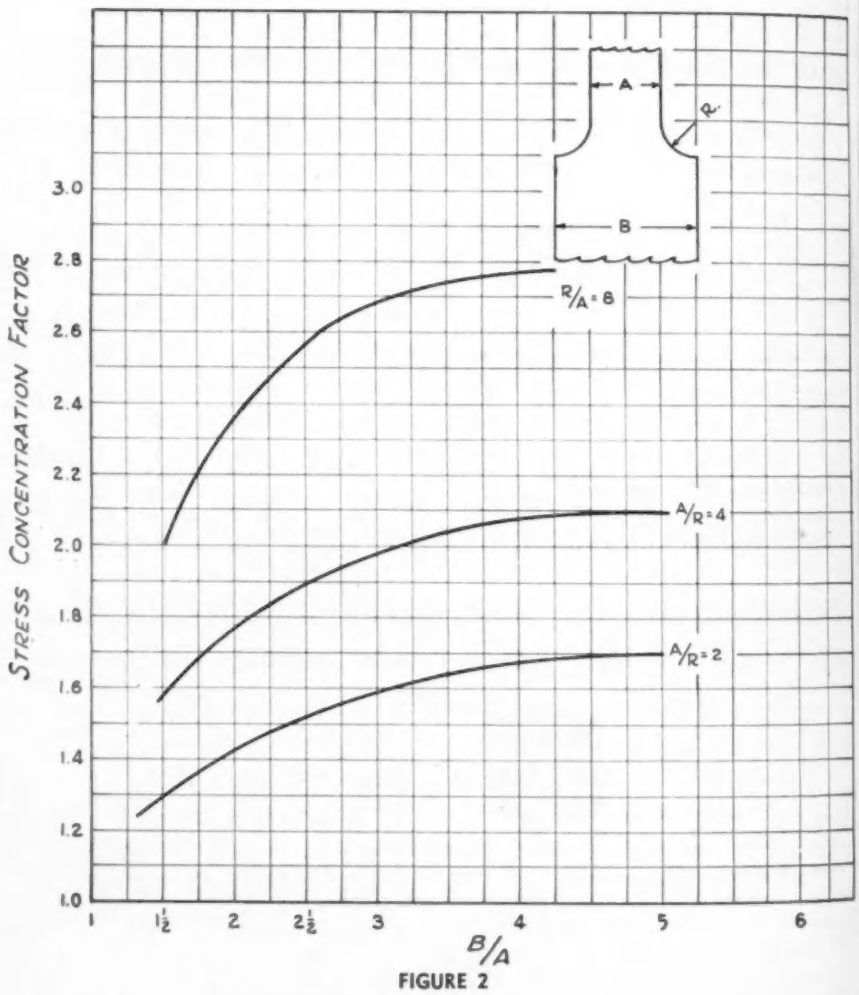

FIGURE 2

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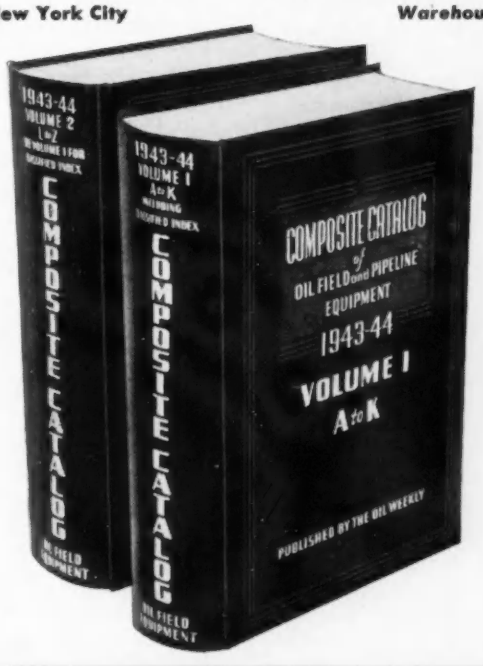

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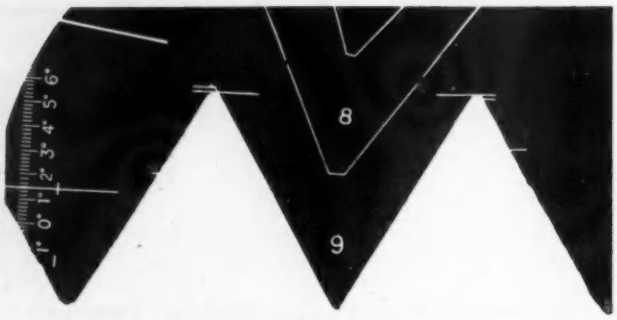

FIGURE 3

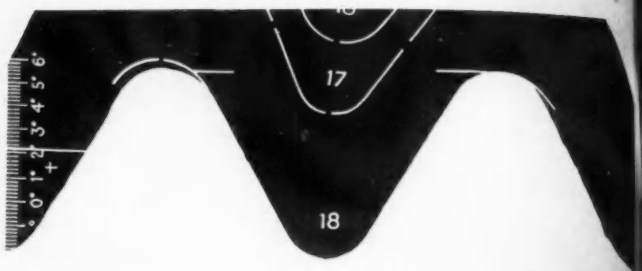

FIGURE 4

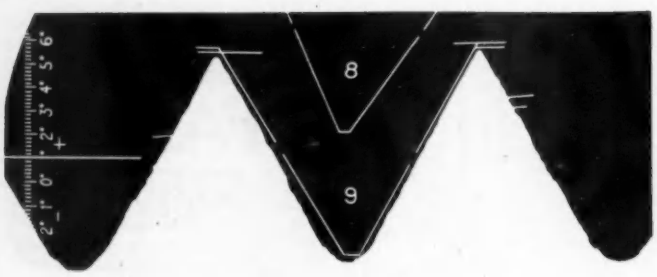

FIGURE 5

FIGURE 6

shown in Figure 7-b is desirable. By increasing the section threaded the average stress and hence the peak stress is reduced. In this case a radius where the first thread starts is also a help in reducing the stress at the root of the first thread. The first thread always carries a large part of the load. In some cases special nuts can be used to distribute the load along the threads.

Machine elements with hubs which have to be pressed or keyed on shafts also create installation problems. If the hub is to go over a long shaft of uniform diameter as in Figure 8-a it is not practical to use a press fit. By using a raised section as in Figure 8-b it is possible to get the hub pressed on without damage to the shaft. When a hub or bearing race is pressed on a shaft, working between the hub and shaft can cause some difficulty since it lowers the resistance to fatigue. It is important to rapidly key a hub to the shaft to prevent working. The use of tapered keys if properly fitted will give improved service. Care must be taken to see that uniform bearing along the key is obtained if it is to perform its function properly.

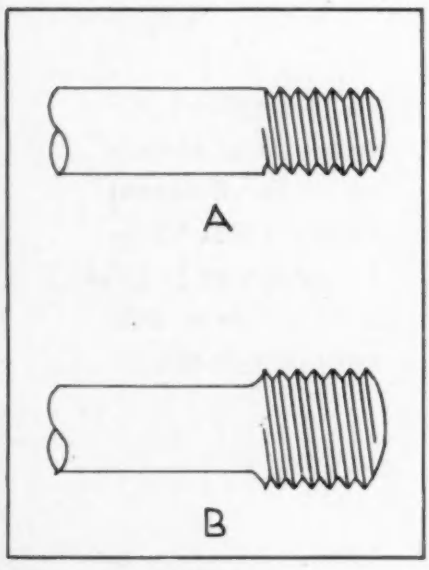

FIGURE 7

Failure in some cases is accelerated by the presence of a small amount of corrosion. As pointed out previously, small corrosion pits are often the starting place for fatigue cracks. In many cases the corrosion pit may be small in size but if it has a sharp radius at its bottom, the stress concentration will be high and the pit may then cause the start of the fatigue failure. The elimination of the cause of the corrosion is desirable but not often possible. In some cases protective coatings can be applied with success. These protective coatings may be metallic or some plastic organic compound. While the plastic compounds are easier to apply in many cases, they cannot be used where they will rub or wear off. When metallic coatings are used it is necessary to obtain a perfect coating. The presence of a single flow in the coating through which the corrosive material may reach the member is sufficient to cause a corrosion pit which may in turn cause failure.

Corrosion failures, when not severe, can often be greatly reduced by the use of proper alloy steels. For normal temperature service nickel alloys give some protection. For more severe conditions the use of nickel and chromium produce good results. The stainless steels where applicable are the best available for general use. Their cost and availability, however, limit their use to commonly encountered applications.

In the general prevention of failure of machine parts the first and most important factor is careful handling during installation, operation and repair. A little more time, proper tools and the making of repairs by properly instructed personnel is very important. Training programs both in the techniques of making of repairs and in the identification of the cause of failures is important. Until the cause has been identified the preventive cannot be applied. The cooperation of management production men and engineers is therefore important in the planning and carrying out good programs for the improvement of equipment performance.

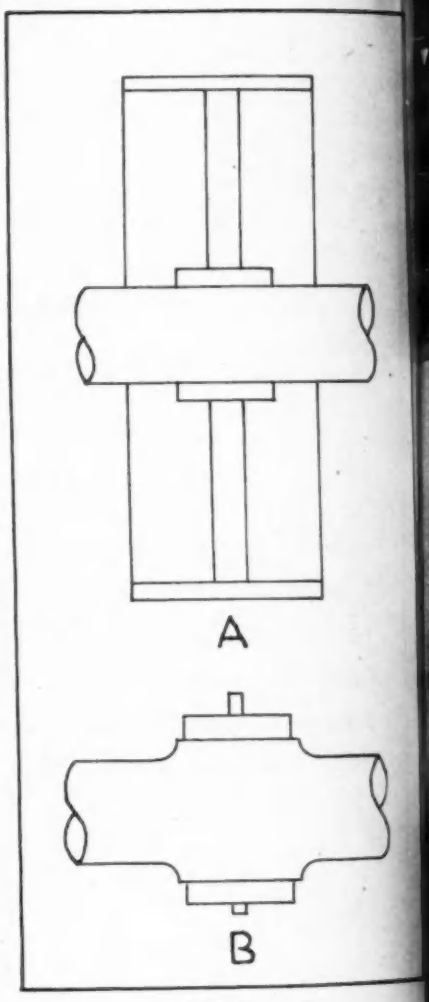

FIGURE 8

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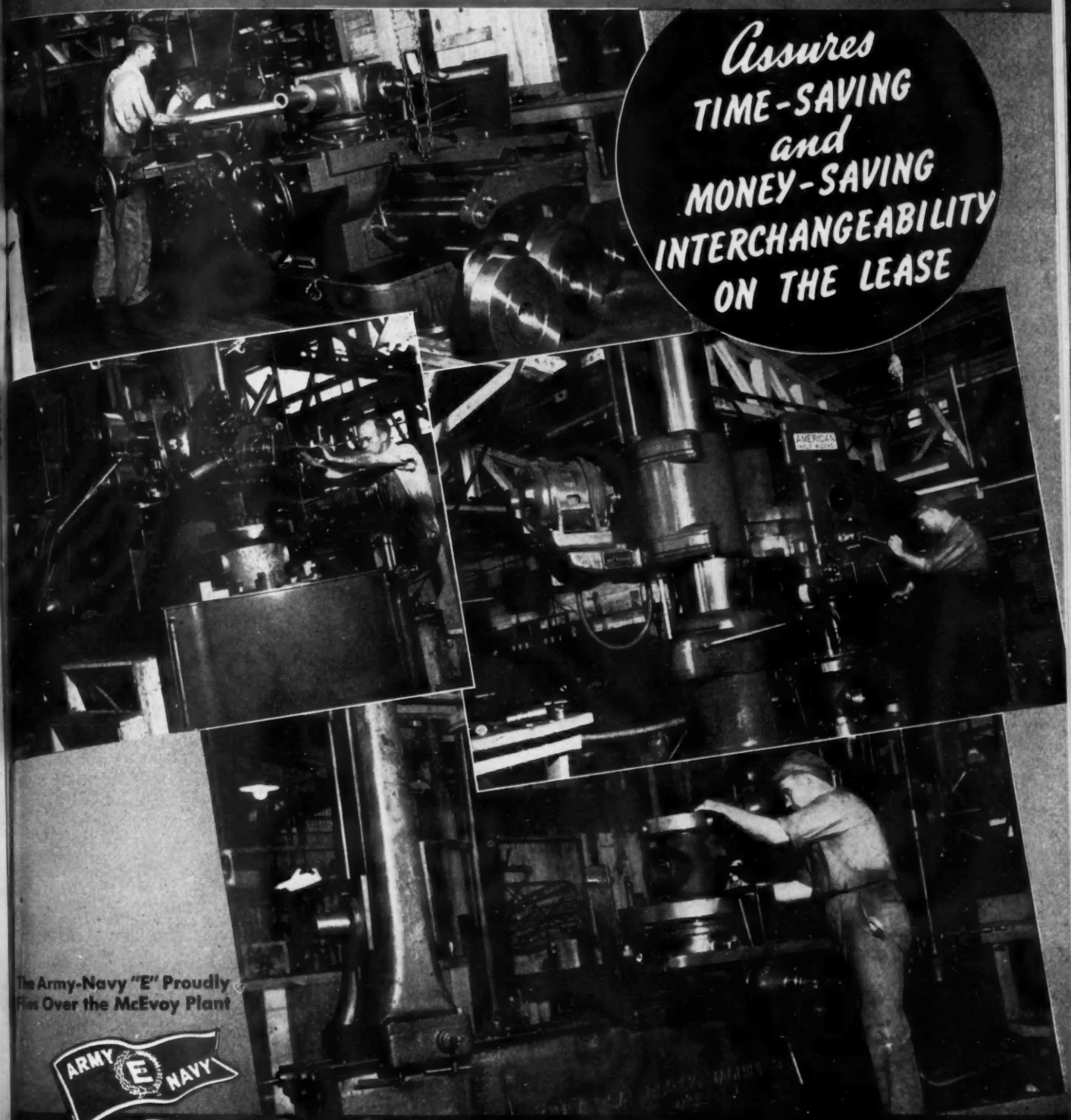

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PART 12

Fundamental Data for the Interpretation of Electric Logs

Knowledge of the resistance of permeable formations when all their pore space contains only water is of extreme importance for the determination of the fluid content of reservoirs from electric logs. This article, which is introductory to the study of oil and gas sands, describes in detail the fundamental electrical characteristics of water bearing formations

THE method of interpretation used at present for the qualitative determination of the fluid content of formations from electric logs is based mainly on experience, and more particularly on experience assembled in the area where the well under investigation is located. Fundamental electrical data relied upon for these investigations are the formation resistivity. Consequently, the reliability of the interpretation method is controlled primarily by the reliability of the resistivity data used.

It has been seen that the true resistivity of a bed is only rarely given directly by the maximum deflection of the resistance curves; usually a correction is necessary. Disregarding this correction would lead in many cases, to erroneous conclusions. The first step to be taken when interpreting an electric log is therefore to determine the true resistivity of the beds under investigation as accurately as possible. The figures thus obtained, and no other, may then be used for fluid diagnosis.

The second step is to infer — and sometimes to determine — the presence or absence of hydrocarbons in the bed, from the correct resistivity value. This is generally done now by comparing this figure with the true resistivity value of the same bed (or of beds assumed to be very similar) found in neighboring wells where production data is available. This often necessitates interpolation, and sometimes extrapolation, over long distances, which renders the method very unreliable in many instances. In fact, the resistivity of a bed is a property which is sensitive to minor changes in the composition and in the repartition of the component minerals and fluids. The usual lateral lithological changes found over relatively short distances in sedimentary formations are sometimes sufficiently large to modify appreciably the resistivity. From a knowledge of the true resistivity value alone it is therefore often impossible, without further study, to draw definite conclusions on the fluids carried by permeable formations. Thus, the application of electrical logging to fluid studies necessarily comprises the two following important problems:

(1.) A geophysical, namely, the production of resistance curves and their use for the determination of the true resistivity of certain beds.

(2.) A geological problem, namely, the translation of the resistivity value in terms of fluid content.

A method for the solution of the first problem has been discussed in preceding articles. Fundamental data for the solution of the second problem will be outlined in this and the following article.

Production of an electric log interests only a small minority, and it will not be discussed here. On the other hand, the determination of the true resistivity of beds should be attempted, preferably, by those who have to interpret the logs. In this respect, it seems necessary to make an important remark.

The mere possession of a modern composite electric log is not sufficient for the determination of the true resistivity of a formation, unless all pertinent data also are available. It has been shown that many factors play their role in giving a resistance curve its particular shape and magnitude. Many of these factors, such as mud resistivity and hole size, are usually known, from company records, by those who have to interpret the log. Data on much more important factors, such as electrode configuration and spacings, must also be obtained. That this latter information is, by far, the most critical data can be illustrated by the following example: Consider a multiple-electrode resistance curve obtained with a long spacing (more than 10 feet). Changes of the order of 50 per cent in such factors as mud resistivity and/or hole diameter result, as a rule in changes of only a few per cent in the resistivity values. On the other hand, changes of 50 per cent in the length of the electrode spacing can produce changes of several thousand percent in the apparent resistivity. For example, suppose that a three-electrode resistance curve shows a maximum value of 6 ohms on a sand 17 feet thick, while the associated shales exhibit a resistivity of 1 ohm. Further, suppose that the mud resistivity and the hole diameter have normal values, but that no information whatsoever is available on the length of the electrode spacing. Now, if it is arbitrarily assumed that a 12 foot spacing was used to obtain the log, then the 6 ohm deflection corresponds to a sand having a resistivity of about 4 ohms (see Part 6 of this series, THE OIL WEEKLY, Sept. 11). However, if it is assumed that an 18 foot spacing was used (almost the critical spacing with respect to the object bed), then the true resistivity is approximately 400 ohms. Thus, because the spacing length is unknown, it is not possible to tell whether the bed has actually a resistivity of 4 ohms, or 400 ohms, or any intermediate value, notwithstanding the fact that the type of electrode configuration is known.

The same could be said if the length of the spacing is known, but the type of electrode configuration is overlooked.

The numerical values used in the foregoing example are not unusual. In fact, there are so many resistant beds being investigated daily by means of electric logs, that many of them must have a thickness which approaches the critical value. When the resistivity of a certain resistant bed is desired and the length of the spacing is unknown, there will always be an uncertainty of the same order as that illustrated above.

A few interesting attempts to take into account the length of the electrode spacing and the thickness of the object bed have been reported in recent literature. Zinszer,[1] for example, has given some quantitative data on the relation between the apparent resistivity and the thickness of beds in a California well. Zinszer's thickness factor is the equivalent of the correction factor mentioned here in a preceding article. These attempts, unfortunately, have been the exception rather than the rule.

Resistivity Data Essential

It cannot be over emphasized that efficient use of electric logs is possible only if reliable resistivity data are available. These, in turn, can be obtained only if the geometry of the logging device is perfectly known. All resistivity data compiled for individual wells or for statistical purposes must take into account this important factor. Doing otherwise would not only make these data useless, but also misleading. It is probable that during the past years many research projects on the interpretation of electric logs have failed because the resistivity values used were the maximum deflections picked on the resistance curves and not the true resistivities. These maximum values were probably read off one type of curve at certain times, whereas at other times they were taken from a different curve. This unsatisfactory procedure is probably one of the main reasons why the use of resistance curves for fluid determinations is still considerered to be an extremely difficult if not hopeless, problem in many instances.

The typical curves given in the preceding articles, although limited to a few ideal cases, will probably be of help in the solution of this phase of the problem of interpretation. If these ideal cases were actually found, accurate resistivity values would be obtained. In practice, formations are often broken or non-homogenous. Therefore, only approximate resistivity values will often be derived from the use of the charts given. This, however, is not very detrimental, because as it will be shown, the qualitative method of interpretation which will be described

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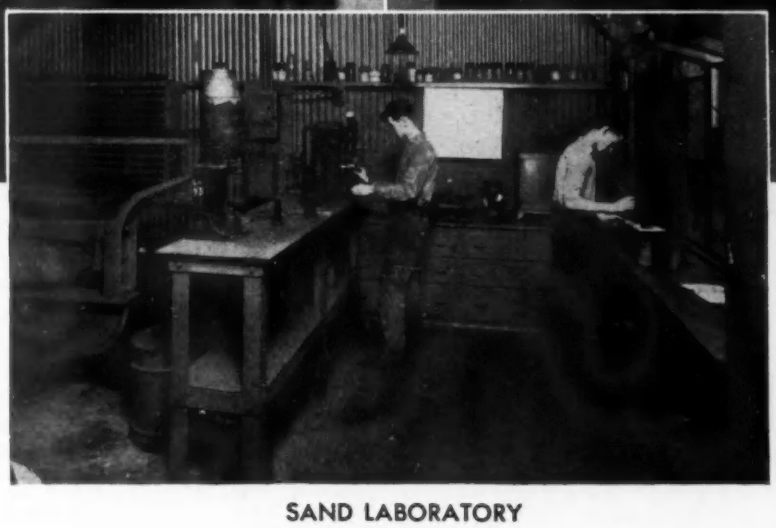

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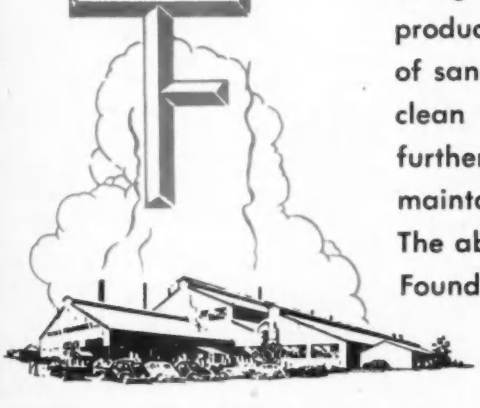

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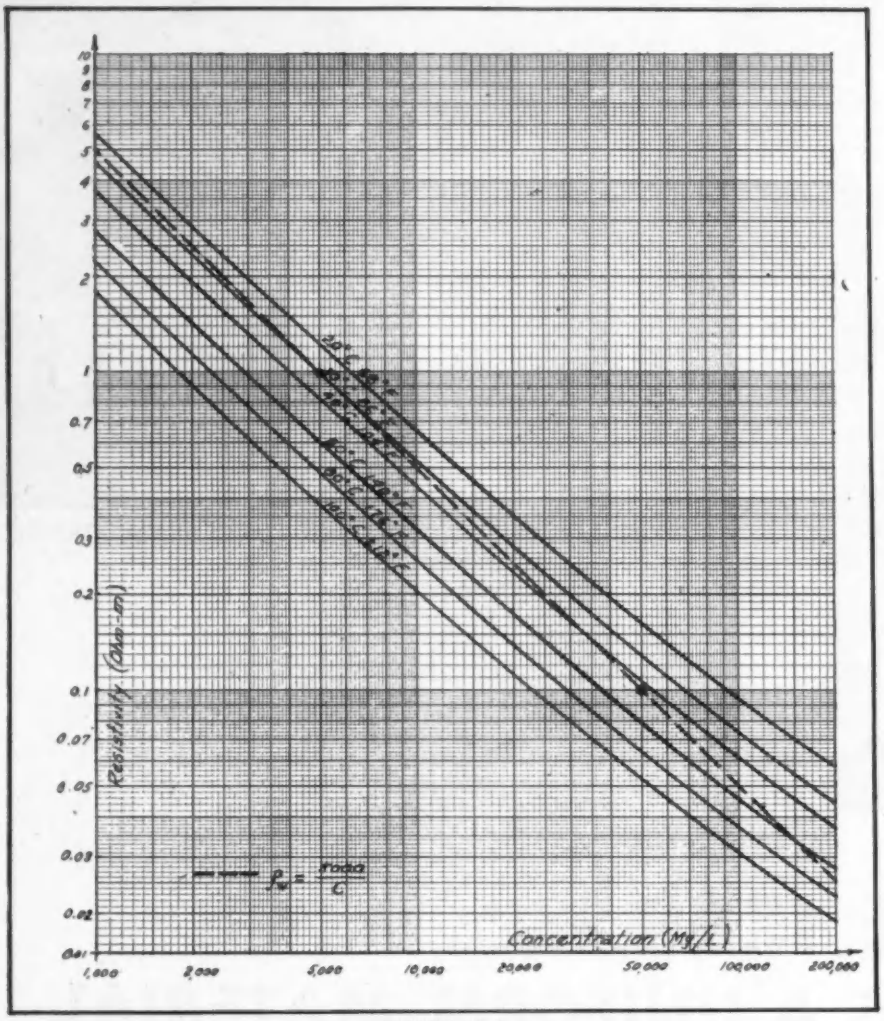

FIGURE 12-1

Resistivity of aqueous solutions of sodium chloride in terms of concentration at constant temperatures

does not necessitate very accurate resistivity values. Those obtained by the application of the principles explained previously will be satisfactory in most cases.

Fundamental Properties of Conductors

Conductance and Resistance. Electrical conductance is the property which characterizes the ability of a substance to transfer an electric current. It is, therefore, as logical to speak of the conductance of a substance to illustrate its ability to transmit electric currents, as to speak of its permeability to characterize its ability to transmit fluids. In practice, and in electrical logging in particular, the concept of conductance has been, unfortunately, supplanted by its reciprocal, the resistance. The resistance is, therefore, that property of matter which characterizes its opposition to the flow of an electric current. Although it is somewhat illogical to speak of the lack of conductance of a "conductor," we shall nevertheless conform to the common practice and consider the resistance of substances, instead of their conductance, whenever possible.

Definition of Resistance. Electrical conductance and, consequently, electrical resistance, is a property common to all forms of matter. The magnitude of the resistance of different materials, however, varies within extreme limits the range being considerably wider than for any other important physical property of matter. The resistance of a substance is, therefore, a very sensitive parameter which, in general, exhibits large variations for relatively small changes in the composition or content of the substance.

Resistance is usually defined as being the property of conductors which determines the current produced by a given difference of potential. Resistance is a function of the dimensions of the conductors, their composition, their texture and their temperature. As it is cumbersome in electrical logging to take into account the dimensions of the substances under investigation, the "specific resistance", is usually considered, rather than the resistance. The specific resistance, or resistivity, is the resistance of a body of the substance of unit length and unit cross section at 0 degrees Centigrade. This property is independent of the shape and dimensions of the substance and, as far as electrical logging is concerned, it depends primarily upon the composition of said substance and upon its character. The effect of temperature is relatively small but, usually, it has to be taken into consideration.

In electrical logging it is convenient to express resistivities in ohm-meters (ohm-m). This unit yields values which are usually comprised between 0.1 and 1,000, and it will be used throughout this article.

In surface exploration, especially during work done for metallic ores, a different unit is frequently used, the ohm-centimeter (ohm-cm.). To convert into ohm-m a resistivity value expressed in ohm-cm, divide it by 100. For example, 2360 ohm-cm equals 23.6 ohm-m.

TABLE 12-1

Classification of Common Conductors

Good Conductors (Resistivity less than 10^{-3} ohm-m)	Fair Conductors (Resistivity comprised between 10^{-2} and 10^{3} ohm-m)	Poor Conductors (Resistivity greater than 10^{4} ohm-m)
Metals	Formation Water	Petroleum
Metallic Alloys	Tap Water	Rock Salt
Most Sulfide Ores	Water Sands and Sandstones	Anhydrite
Most Arsenide Ores	Oil Sands and Sandstones	Dense Lime
Graphite	Gas Sands and Sandstones	Quartz
	Shales	Coal & Lignite
	Clay	Igneous and Metamorphic Rocks
	Porous Lime	Sulphur, Bakelite Porcelain, Glass

Classification of Conductors

Conductors are usually grouped into a number of classes, the members of which possess certain properties in common.

Metallic and Electrolytic Conductors. When the physical nature of conduction in solids and liquids is considered, substances are divided into two types: metallic conductors and electrolytic conductors. The movement of electricity through metallic conductors is carried on without any material effect in the substance. On the other hand, the passage of an electric current in electrolytic conductors is accompanied by a transfer of matter in the substances. This difference, however does not play any appreciable role in electrical logging (at least when the conventional methods are used) and this distinction can be disregarded here.

All metals and metallic alloys possess metallic conductance, while electrolytic conductors comprise all the ordinary solutions of salts in water. The latter are usually called "electrolytic solutions."

In many cases an electrolytic solution of high conductivity results when a substance, which is itself a poor conductor, is dissolved in a poorly conducting liquid. The most typical example is salt water, the two components of which (NaCl and H2O) are extremely poor conductors when in the pure state.

It is customary to call the dissolved substance, the "solute", and the liquid in which it is dissolved the "solvent."

Good Conductors and Poor Conductors When the magnitude of the conductance is considered, substances are usually classified into three groups: good conductors, fair conductors and poor conductors.

Table 12-1 lists the most typical substances belonging to each group. The numerical values given indicate the usual range of resistivities of the substances of each group at the usual temperatures found in bore holes. It can be seen from this table that all fair conductors contain water. More specifically, they contain water in which a relatively large amount of salts are dissolved. For the sake of simplicity, this water will be designated here by the broad name of "formation water." A close inspection of a complete list of the fair conductors found in the earth crust would reveal that most of them consist of poor conductors containing formation water in their pore space.

The conductivity of these substances is therefore almost entirely (and for all practical purposes, entirely) due to formation water.

Non-clastic sedimentary rocks are usually poor conductors (rocksalt, anhydrite).

As far as electrical logging in petroleum areas is concerned, approximately 95 per cent of the formations logged are fair conductors, and about 5 per cent are poor conductors. Good conductors are almost never found (casings, of course, are excepted). The conductivity of formation water plays, therefore, a fundamental role in electrical logging. Before attempting to discuss the resistivity of rocks it is therefore necessary to review briefly, first, the properties of electrolytic solutions, and more particularly, the properties of formation waters.

Electrolytic Conductance

There are several factors which affect directly the conductivity of electrolytic solutions, the most important of which are: the nature of the solvent, the nature of the solute, the concentration of the solute, and the viscosity of the solution.

Mineralized waters are the only electrolytic solutions existing in the formations found in petroleum areas. Water is therefore the only solvent with which we are concerned, and only aqueous solutions will be examined here.

Influence of the Nature of the Solute If we except fresh water and sulphur water, the conductivity of most subsurface waters is mainly due to chlorides, sodium chloride being particularly predominant. The amount of sulphates is usually small except in certain waters associated with deposits of chemical sediments, in which the quantity of sulphates is sometimes of the same order as that of chlorides. In electrical logging, only the magnitude of the conductivity of waters is usually considered, and the nature of the solutes, therefore can be disregarded. During most of the following discussion the exact composition of the salts disolved in subsurface waters will not be considered, and it will be assumed that only sodium chloride is in solution. Results obtained with this salt may be extended to actual formation waters, not only qualitatively, but in most cases, quantitavely also.

Influence of Concentration. The solubility of salt in water is relatively large. At normal temperatures it is possible to dissolve as much as 360 grams of salt in one liter of water (265,000 ppm). The usual formation waters contain, however, a much smaller amount of salt. These solutions are therefore never saturated and their concentration cannot be a function of certain external factors (temperature, for instance), contrary to statements found sometimes in the well logging literature.

The concentration of a solution may be expressed quantitatively in several ways, usually in milligrams per liter (mg/L), or in parts per million (ppm). The relation between these two quantities is

$$\text{ppm} = \frac{\text{mg/L} \times 10^6}{10^6 + \text{mg/L}}$$

or

$$\text{mg/L} = \frac{\text{ppm} \times 10^6}{10^6 - \text{ppm}}$$

The larger the concentration of a solution, the higher its conductivity, and therefore the smaller its resistivity. This is illustrated on Figure 12-1 which gives the resistivity of aqueous solutions of sodium chloride in terms of concentration at various temperatures. It can be seen that the resistivity is approximately inversely proportional to the concentration. There is, however, no simple formula giving accurately the relation between resistivity and concentration over a wide range of conditions. When the resistivity of a solution at a given concentration is needed with accuracy, it is necessary to use a chart like that of Figure 12-1. However, when a approximation is sufficient the following simple formula can be used:

$$R_w = \frac{5000}{C} \qquad (12\text{-}1)$$

where R_w is the resistivity of the solution in ohm-m, and C is the salt concentration in milligrams per liter.

The error made by the application of formula (12-1) is usually less than 10 per cent when the temperature of the water is around 37 degrees Centigrade (about 100 degrees Fahrenheit) and the concentration is comprised between 5,000 and 30,000 milligrams per liter. The same approximation obtains around 50 degrees Centigrade (122 degrees Fahrenheit) for a range of concentration from 30,000 to 150,000 milligrams per liter, namely for the usual formation waters.

The curve representing equation (12-1) is shown in dotted lines on Figure 12-1.

Influence of Temperature. Another important factor upon which the conductance of a solution depends is the viscosity of the solution itself. This is due to the fact that the conductance of an electrolytic solution is caused by a motion of relatively large particles in the liquid. The speed of these particles, and consequently, the conductivity, will obviously depend upon the resistance which they meet in their movement, that is to say, upon the viscosity of the solution. At a given temperature, the viscosity decreases appreciably when the temperature of the solution increases. Therefore, it can be expected that the conductivity will increase and that its reciprocal, the resistivity, will decrease when the temperature increases. This has been actually verified. Figure 12-2 represents the viscosity of water (dash line curve), and the resistivity of two solutions of salt (plain lines) in terms of temperature. Curve No. 1 refers to a solution containing 10,000 milligrams of salt per liter (10,000 parts per million), whereas curve No. 2 refers to a solution of concentration about three times as great (29,000 parts per million). These curves show the parallel existing betweeen the changes of restivity and the changes of viscosity due to temperature.

TABLE 12-2
Analysis of Water from Three Shallow Wells of Houston, Texas*

IONS	PARTS PER MILLION		
	Well A	Well B	Well C
Silica (SiO_2)	5	7	4
Iron & aluminum oxides (Fe_2O_3)	0	0	0
Calcium (Ca)	2	18	19
Magnesium (Mg)	2	3	6
Sodium & Potassium (Na & K)	160	114	114
Sulphate (SO_4)	0	12	0
Chloride (Cl)	40	42	49
Carbonate (CO_3)	0	0	0
Bicarbonate (HCO_3)	371	285	305
Nitrate (NO_3)	..	..	..
Hydrogen sulphide (H_2S)	..	..	..
Total solids (calculated)	580	481	497
Total solids (actual)	581	481	498
Suspended solids separated by filtration	0	3	..
Hardness calculated as calcium carbonate	11	57	72
Hardness, soap method, calcium carbonate	13	51	73
Hypothetically Combined			
Calcium carbonate ($CaCO_3$)	0	0	0
Calcium bicarbonate ($Ca(HCO_3)_2$)	8	73	77
Calcium sulphite ($CaSO_4$)	0	0	0
Calcium chloride ($CaCl_2$)	0	0	0
Magnesium bicarbonate ($Mg(HCO_3)_2$)	12	18	36
Magnesium Sulphate ($MgSO_4$)	0	0	0
Magnesium chloride ($MgCl_2$)	0	0	0
Sodium bicarbonate ($NaHCO_3$)	488	296	299
Sodium sulphate (Na_2SO_4)	0	18	0
Sodium chloride (NaCl)	67	69	81
Silica, iron & aluminum oxides	5	7	4
Total solids, calculated	580	481	497
pH	8.2	7.7	7.6

* Analysis made by the City of Houston Water Department, Sanitation Section.

At low temperatures, the change in resistivity due to temperature changes is relatively great. For instance, the resistivity of the solutions of Figure 12-2 is reduced 50 percent when the temperature increases from 32 degrees Fahrenheit to 75. This decrease is less at higher temperature, thus at 110 degrees an increase of 100 degrees is necessary to reduce the resistivity by 50 percent. Most sedimentary formations owing their electrical conductivity to formation water, they will exhibit the same changes in resistivity in terms of temperature, and it is necessary to take them into account when the resistivity of beds has to be determined accurately.

Influence of Pressure. Changes in the pressure exerted on an electrolytic solution modify several of its properties, in particular, its viscosity, volume, and ionization. These in turn will result in changes in the resistivity of the solution. For the usual formation waters, an increase in pressure from 0 to 5000 pounds per square inch results in an increase in resistivity of less than 5 percent at 70 degrees Fahrenheit. At higher temperatures, the change is still less. The considerable changes in pressure found in bore holes can therefore be considered as exerting no appreciable influence on the resistivity of formations.

Magnitude of Resistivity. Although formation waters have a resistivity as low as a fraction of an ohm-m, it is well to keep in mind that, compared with metallic conductors, this resistivity is relatively high. For instance, copper and steel have a resistivity approximately one millionth as great as that of the most conductive formations.

Resistivity of Water Sands

It will be shown in a forthcoming article that, as far as resistivity is concerned, oil sands can be considered as being water sands in which part of the conductive water has been replaced by a poor conductor, the oil. An understanding of the possibility of using resistivity data for fluid content determinations requires therefore a knowledge of the basic electrical characteristics of water sands. While it is not possible here to consider in detail the numerous types of sands found in petroleum areas, a brief discussion of the characteristics of the most common permeable beds will be made prior to the analysis of the resistivity of oil sands. In this article, only water-bearing formations will be considered.

Rock-forming minerals (quartz, feldspar) are poor conductors. If a rock is solid throughout, or if it contains only isolated voids, it is a poor conductor itself, regardless of the fluid it contains. The pores of porous beds are usually interconnected, and they are filled with water. The presence of this formation water imparts a good conductivity to the formations, the magnitude of which

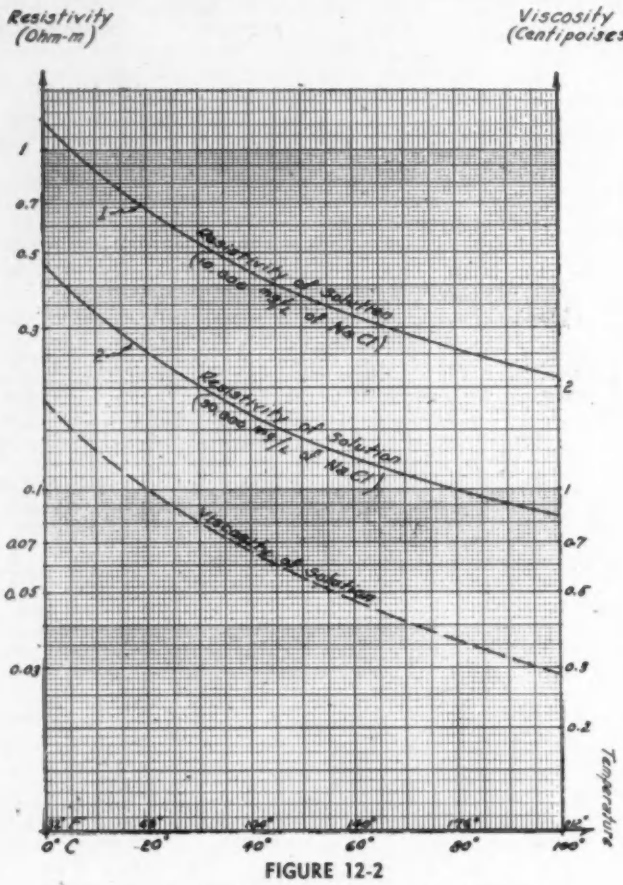

FIGURE 12-2

Decrease of viscosity and resistivity of sodium chloride solutions with temperature.

is a complex function of numerous factors. It is found, however, that the conductivity of any permeable material, the solid phase of which is a poor conductor, is a function of only two independent factors, which are: (1) The geometry of the pore space and (2) The resistivity of the water it contains.

If an exact analytical or empirical relation could be found to express the influence of these two factors, it would be a simple matter to determine accurately the resistivity of any permeable bed. This has not been done satisfactorily yet, and only the influence of the second factor can be accurately accounted for.

The effect of the resistivity of the formation water on the reservoir resistivity is extremely easy to find. In fact, the solid particles of a sand, sandstone, limestone, or shale, being nonconductive, the conductivity of any of these formations is due entirely to the water it contains. Consequently, its resistivity ρ_w is proportional to the resistivity R_w of the water, and it can be expressed

$$\rho_w = FR_w \qquad (12\text{-}2)$$

where F is a proportionality factor which is called the "formation factor." Rearranging equation (12-2), the following expression is obtained for the formation factor:

$$F = \frac{\rho_w}{R_w} \qquad (12\text{-}3)$$

This factor F is proportional to the bed resistivity, and conversely. For a given formation water, the factor F can therefore be used as a measurement of the resistivity of the bed.

The formation factor is a very convenient and important concept which constitutes the basis for the interpretation of resistance curves. This concept seems to have been introduced a few years ago by Archie,[2] who studied its variations in terms of porosity and permeability of various sands.

It is obvious from equation (12-2) that the influence of the geometry of the pore space on the resistivity of a formation is fully represented by the factor F. More exactly, the factor F is an expression of the water distribution within the sand. However, as it is usually more difficut to visualize the geometry of the formation water than the geometry of the grains and their packing, the effect of these latter factors, rather than that of the former, will be considered here.

The formation factor embodies the effect of grain size, grain shape, grain distribution and grain packing. The effect of the porosity of the formations is consequently comprised in the formation factor.

Before attempting to formulate an analytical expression for the factor F, it will be necessary, first, to discuss briefly the effect of all pertinent variables on this factor.

Sands are an assemblage of small loose fragments of rock consisting of very hard minerals, of which quartz or feldspar predominate. In the Gulf Coast, for example, these two minerals constitute approximately 90 percent of the sand grains, other materials making up the remainder. All of these solid particles are extremely poor conductors.

When a sand is compressed, for instance, by the weight of the overlying formations, it becomes consolidated. When part of its grains are cemented with minerals by chemical or physical agents a sandstone is formed. No fundamental distinction will be made here between sands and sandstones, and in many cases, even to certain limestones and shales.

In nature, sand grains are neither uniform, nor spherical. They occur in a variety of shapes and in many graduated sizes. Variations in size, shape, compaction, consolidation, and cementation sometimes cause large variations in the formation factor and therefore in the resistivity of the bed.

Effect of Grain Size. Like porosity, the formation factor is a dimensionless quantity. If the grains of a sand are enlarged or reduced to any degree, their arrangement being kept the same, both the formation factor and the porosity remain exactly constant regardless of size. It is known that this is not true for the permeability which changes appreciably with the absolute size of the grains. It can therefore be expected that the conductivity and the permeability of a water sand are usually independent quantities. This has been verified. There is only one case where these two properties are closely related, namely, for a hypothetical sand consisting of spherical grains of uniform and constant size, but packed differently. It can be shown that, in this case, a packing which increases or decreases the permeability will increase or decrease the conductivity proportionally.

Effect of Packing. The foregoing statement that the absolute size of the grain forming a sand has no influence on the porosity and on the formation factor applies only to homologous packings. It does not prove always true for assemblages of natural materials of small size because as the grain size decreases, friction, adhesion and bridging become of increasing importance, due to the higher ratio of surface to mass. This increases the porosity and, usually, decreases the resistivity of the sand, i.e., decreases the value of the factor F. In general, the looser the packing, the smaller the resulting formation factor, regardless of the absolute dimension of the grains.

Effect of Grain Size

Effect of Non-uniformity of Grain Size. Whether the grain size is uniform or not, is of importance with respect to the value of the formation factor. The lowest values are commonly obtained when the grains are all of the same size. To such an assemblage, the addition of grains of either a larger or a smaller size tends to increase F. The increase can be appreciable when much coarser or much finer sands are mixed with one of a given size (silty sand).

Effect of Shape of Grain. The shape of the grains of a sand is probably never truly spherical, but varies within wide limits. Irregularities in shape result in a larger possible range in the factor F than if spherical grains are considered, because irregular forms may, theoretically, be packed either more tightly or more loosely than spheres. In practice, it is found that angularity either increase or decrease F. The most typical angularity which increases this factor is that in which the grains are mildly and uniformly disk-shaped.

Resulting Effect. The formation factor of clean sands is a composite resultant of grain-size, uniformity of grain size, distribution of grain-size, shape of grain and packing. Sedimentary deposits are uniform in grain size and texture only under exceptional circumstances. Consequently, the formation factor of a given sand will be uniform in only rare instances. In general, it will fluctuate from area to area, owing to variations in grain size and character caused by the varying conditions under which the sediment was deposited (regional variations). When very small samples of sand (less than one cubic cm) are considered, local changes in grain size, packing, etc.—also modify the formation factor (local variations). On the other hand, when large samples are available (several cubic inches, or more), the average packing and distribution of the grains is usually reasonably averaged, resulting in a rather uniform formation factor, regardless of the direction considered. In other words, a large sand sample

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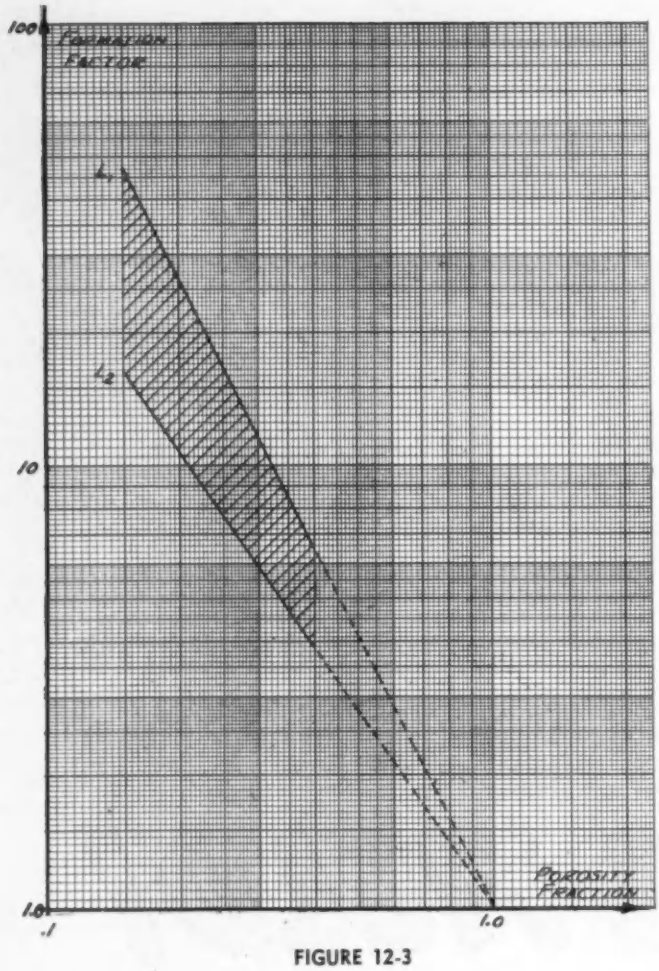

FIGURE 12-3

is isotropic horizontally. The resistance measurements made during logging involve, in general, several cubic feet of material. Therefore, they usually give data which is quite representative of the sand condition in the neighborhood or the bore hole. The same remark applies if laboratory tests are made on samples of sufficiently large size (several cubic inches).

Effect of Cementation. A large number of sediments have undergone some degree of consolidation. For the problem with which we are concerned, mere compaction can be considered as a particular case of tight packing, and, consequently, need not be discussed here. On the other hand, cementation is a more complex case which requires some brief comments.

Pore Spaces Filled

Prediction of the influence of cementation on the formation factor is an extremely difficult problem, and only very broad statements can be made regarding cemented sands. The cementing material consists usually of silica, iron oxides, or carbonates, which are all poor conductors. The result of cementation is, then, to fill up with a non-conductive substance a certain volume of pore spaces which, otherwise would contain a conductive fluid. The effect of cementation is, in general, to increase F. In the case of extensive cementation, F can reach very high values. An extreme condition is obtained when the cementation is so large that the porosity of the material occurs only through isolated voids. In this case, the formation factor, and consequently the resistivity, reach an infinitey high vaue.

Because cementation is often accompanied by a redistribution of the pore spaces, it happens sometimes that it is accompanied by a decrease in the value of the formation factor. Such cases, however, are very rare.

Effect of Silt. Almost every sand contains a few percent of very fine material, called either clay, or shale, or silt, or bentonite. These materials are composed mostly of aluminum silicates, aluminum hydroxide, and iron oxides, and are therefore non-conductors. As far as electrical logging is concerned, the exact mineralogical nature of the rocks forming this material is immaterial, and here these particles will be called "silt" regardless of their composition. The size of the solid material constituting this silt is sometimes considerably smaller than the size of the sand grains, as evidenced by photomicrographs. These particles are much too small to modify appreciably the packing of the sand, and usually they occupy part of the voids situated between the sand grains. The result is that some of the conductive formation water is replaced by a non-conductive material, while the packing of the sand remains undisturbed. It is evident, then, that the effect of silt is to decrease the conductivity of the water sand, and consequently, to increase its formation factor. The larger the amount of silt contained in the sand, the higher will be this factor. The absolute change of resistivity is, however, relatively small in general, because sands usually carry only a moderate amount of silts. Furthermore, the particles of silt are packed in such a fashion that the silt itself has a texture similar to that of a sand; it is made of solid particles surrounded by formation water. It has, therefore, a fair conductivity. The net result is, then, to replace part of the water contained in the sand by a material having a resistivity only several times higher, perhaps ten times higher. It is evident that, unless the quantity of silt is extremely large, the increase in the formation factor will be relatively small.

Effect of Porosity

From the foregoing discussion, it can be seen that any change in the geometry of the pore space which increases the porosity, usually decreases the formation factor. In order to find out whether a simple relation exists between these two properties, Archie[3] investigated the variations of F for a large number of sands and sandstones of the Gulf Coast area ranging from 10 to 40 percent in porosity. By plotting on log paper the experimental values of F in terms of porosity, he obtained a good grouping of points. These are comprised between the two straight lines L_1 and L_2 shown on Figures 12-3, and they suggest the following simple relationship,

$$F = P^{-m} \qquad (12\text{-}4)$$

where P is the effective porosity fraction of the sand, and m a factor which is constant for a given sand, but may vary between sands having the same porosity. No proportionality factor is necessary in equation (12-4), because it is evident that for a porosity fraction of one, the formation factor will be equal to unity.

Formula (12-4) has the great advantage of representing reasonably well, and in a simple manner, a very useful relationship. In fact, the effective porosity of a sand is, among the properties upon which F depends, that which is the most easily measurable. The problem of expressing F in terms of the geometry of the pore space, although not entirely always solved by equation (12-4) is, however, considerably simplified.

For the range of sands investigated by Archie, the factor m of equation (12-4) was found to vary from 1.3 for unconsolidated sands to 2.0 for cemented formations. The higher the degree of cementation, the larger the factor m seems to be, in general. It is therefore logical to call m the "cementation factor." There is no known method of determinating accurately the cementation factor directly.

The physical signification of the cementation factor m can be explained as follows: If the pores of the sand were a bundle of straight parallel cylindrical tubes, the formation factor F would be equal to P, and the cementation factor m would equal unity. Actually, the pores form tortuous channels which the electric current must follow. This increases the total length of the conducting paths, which in turn, according to Ohm's law, increases the resistance of the substance. For actual sands, the formation factor F is therefore greater than P, which means that the cementation factor must be greater than unity. When the sand is cemented, many original pores are blocked by resistant material, and the electric current must detour more than in non-cemented sands, which increases the sand resistance. The factor m is therefore relatively large for cemented sands and, in general, it increases with the degree of cementation.

The chart of Figure 12-4 gives the probable values of F for clean sands and sandstones in terms of their porosity. This chart being only approximate should be used for the determination of the formation factor only when a direct measurement of this factor is not possible.

Resistivity of Shales

A shale, like a sand, is a network of small reservoirs containing formation water. The reservoir itself is made of poorly conductive substances, mostly aluminum silicates. Although the porosity of a shale is relatively small, and its permeability considerably less than that of a sand, shales have nevertheless

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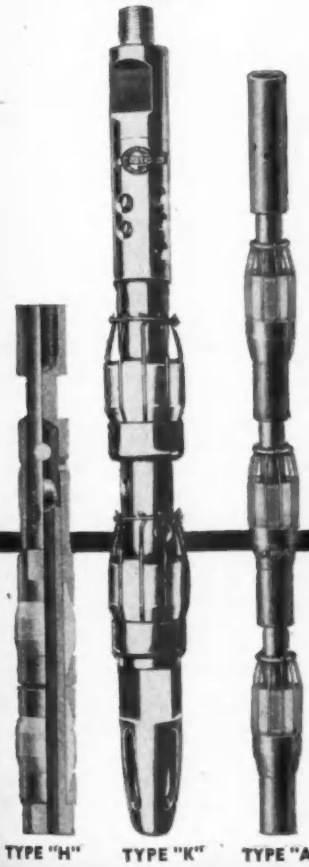

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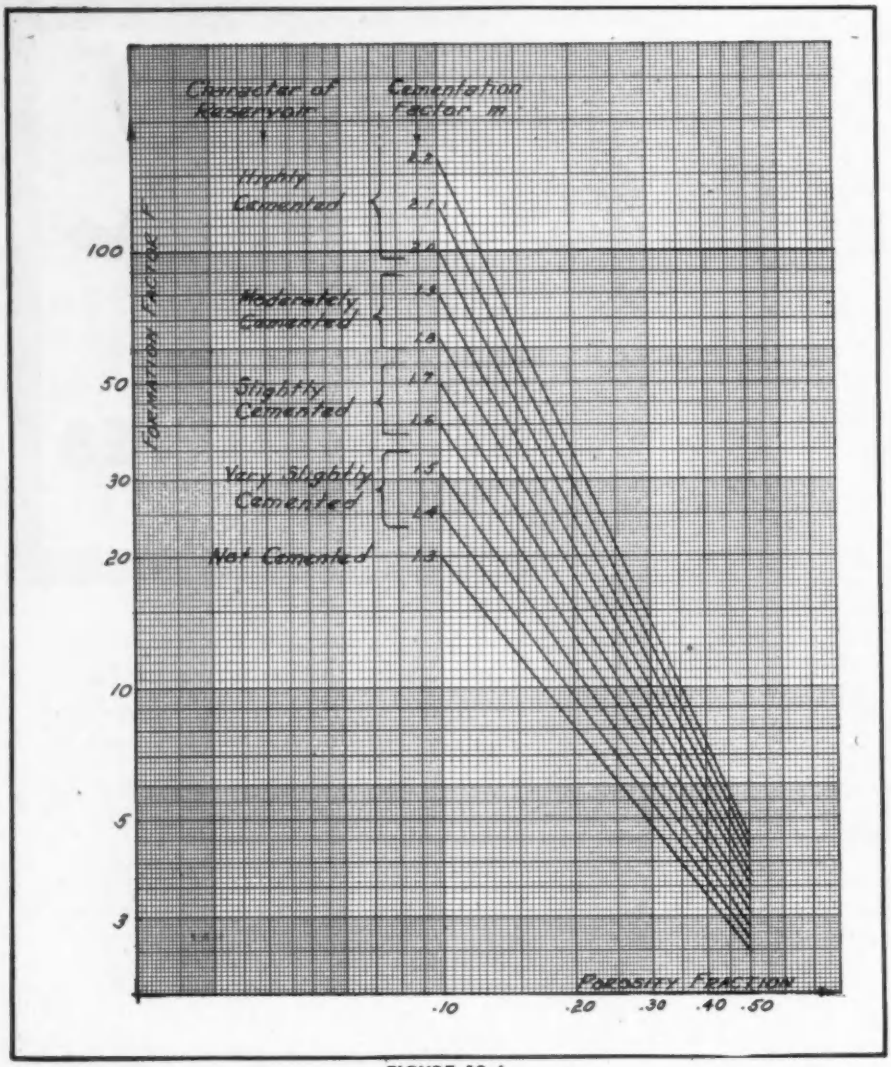

FIGURE 12-4
Chart for computing an approximate value of the formation factor of sands in terms of their porosity and degree of cementation.

a fair conductivity because most of the pores are usually interconnected and filled with formation water. Basically, then, a shale is not different from a sand. The only dissimilarity is in the dimension and shape of the solid particles. All that has been said previously regarding sands applies, therefore, to shales provided the correct values are used for the lithological factors F, P and m, and for the water resistivity.

	P	m (Assumed)	F (From Chart)	R_w	ρ_w (Calculated)	ρ_w (Experimental)
Mid-Continent	0.05	1.4	65	0.1	6.5	6
Gulf Coast	0.15	1.3	11.7	0.1	1.17	1

From observations made by Athy[3] and Fraser,[4] the porosity of shales vary widely with depth because of the present and past compaction produced by the pressure of the overlying sediments. Old shales are more compact than recent shales, all other factors remaining the same. Also, in a given locality, the compaction of shales having approximately the same age increases with depth.

Athy assigns a porosity of 5 percent to shales situated at a depth of 6000 feet. This figure refers probably to the older shales of Mid Continent. In the Gulf Coast, shales have a porosity of approximately 15 percent at that depth. Formulas 12-3 and 12-4 will be applied to these two kinds of shales, with the assumption that the salinity of their water is the same as that of present day sea water (3.5 percent of salt, namely 36,300 milligrams per liter giving a resistivity R_w of 0.1 ohm-m at 145 degrees Fahrenheit.) The resistivity ρ_w of these shales, as given by electric logs averages 6 ohm-m and 1 ohm-m, respectively.

The pertinent data and results are summarized in the above table.

It can be seen that the experimental and calculated results check very well. It is therefore probable that the assumption made, namely, that shales are physically similar to sands, is correct.

Fresh Water Sands

The preceding discussions regarding the factors F and m apply, evidently, without modifications to fresh water sands. In the computation of these factors it is essential to remember, however, that the resistivity of their formation water is much higher than for deeper sediments, the increase being of the order of one hundred. In general, the chart of Figure 12-1, established for sodium chloride, may not be applied for the computation of the resistivity of this water, because of the relatively large amount of other salts present. This is shown on Table 12-2 which gives the analysis of the water of three shallow wells located within the city of Houston. The resistivity of the Houston water averages about 13 ohm-m at room temperature.

From investigations made by Rose,[5] the average porosity of the fresh water sands of this area is 40 percent. The mean resistivity of these formations is found to be about 40 ohm-m. Computations based on these figures give for the cementation factor m a value of 1.3, which corresponds to non-cemented reservoirs.

A similar verification is difficult to make for shales associated with fresh water sands because the resistivity of their formation water is usually not available. It is most probable, however, that formula (12-4) applies also to these shales.

In shallow water sands, practically all of the original salt water has been displaced by meteoric water. The associated shales having a much smaller permeability (perhaps one millionth as great), it is probable that their water still contains some of the original minerals. This can be verified by reversing the calculation procedure used previously. Assuming that shallow shales have a porosity of 30 percent, and assigning a value of 1.3 to the cementation factor, the chart of Figure 12-4 gives a formation factor of 4.75. The resistivity of these shales if found, from electric logs, to average about 4 ohm-m. The water resistivity is therefore:

$$R_w = \frac{\rho_w}{F} = \frac{4}{4.75} = 0.85 \text{ ohm-m.}$$

If the dissolved salts are composed mostly of sodium chloride, the salt concentration of this water is of approximately 7500 parts per million (from chart of Figure 12-1).

Conclusion

The foregoing discussion has shown how the electrical characteristics of water-bearing formations can be accurately investigated in a very simple manner. The method has only few practical applications for the solution of problems directly related to water. On the other hand, it will be seen in a later article that it is of extreme importance for the determination of the presence of petroleum in permeable beds.

ACKNOWLEDGMENT

Many sections given in this article have been suggested by the interesting treatments of H. J. Fraser[4] and L. C. Graton and H. J. Fraser.[6]

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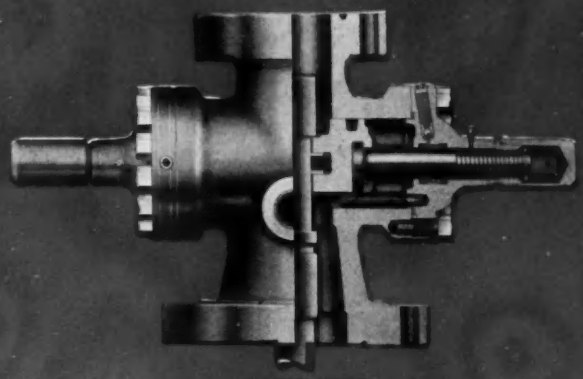

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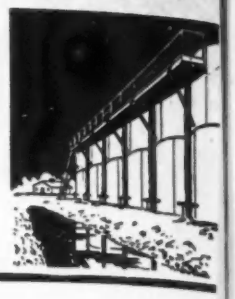

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Water Measuring Device Checks Well Production

Frequently it is desired to know the amount of waste water from a given well or from a treating unit, without involving the erection of tanks or the installation of weirs for determining the rate of flow.

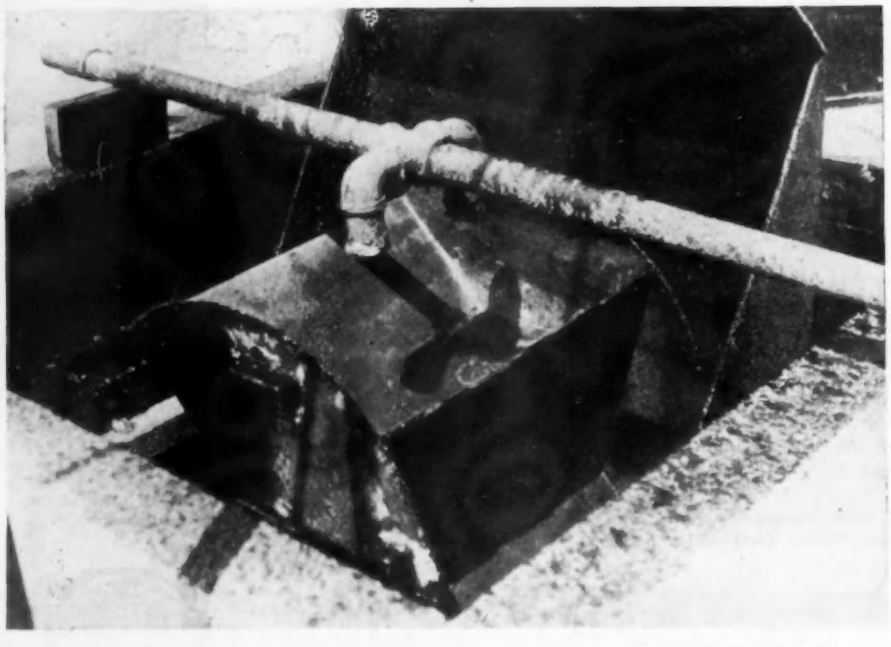
WASTE WATER DETERMINATION

One company solved this problem by salvaging the weighing device formerly within the separator on one of the leases, mounting the unit in the open air over a pit communicating with the waste water disposal system.

By diverting the flow into this unit, an accurate record is obtained of the fluid handled, without the need for waiting until sufficient has accumulated to enable determination from gauging.

In the unit shown, the 2-inch line bringing the waste flow is carried through a cross, ells and short nipples directing flow into the hopper of the weighing device, while a short nipple blinded with a bullplug serves to support the whole at the proper height. Dividing the flow aids in obtaining accurate readings, as the jetting action of the stream is greatly reduced and more uniform delivery obtained than when a single outlet is used.

If the unit be set up where prevailing winds can whip across the inflowing streams, provision of a hood which will deflect the air currents will prevent water loss, and afford a more nearly complete check of the volume being produced. Such a housing may be of light sheet metal, with a side or end which may be raised for inspection and occasional cleaning.



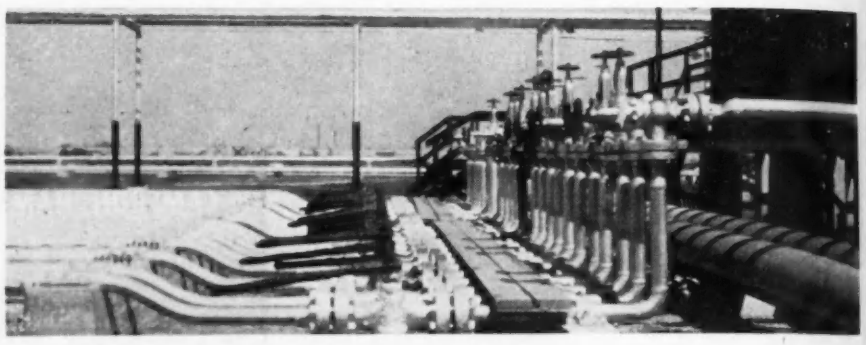
Metering of waste water from well or treating unit is simplified by setting up this salvaged unit from a separator, and arranging waste flow to pass through device en route to disposal.

Unitized Manifold Aids Flow and Repressuring

When flowing wells are to be adjusted for volume, and injection wells controlled as to inlet pressures at a recycling plant, grouping of the flow beans and master valves simplifies pressure manipulation.

PRODUCTION CONTROL

By bringing the lines in on low concrete supports, a horizontal setting of the high-pressure plug valves is accommodated, with the operating handles swinging in arcs which leave the side of the manifold toward the plant unobstructed and accessible at all times.



Combining the well production controls and the valves regulating amount of return in cycling plant, accurate balancing can be obtained without excessive travel on the part of the operators.

Sweep ells and flow beans then carry the lines into the plant at a level which facilitates flow bean setting and at the same time removes the adjusting handwheels from danger of accidental shifting as plug valves are manipulated.

A plank walk, laid atop and clamped to the manifold lines between plug valves and sweep ells, provides easy access to the beans and to the valves which must be operated to obtain desired flow conditions.

Outdoor Control Grouping Betters Fire Control

Outside grouping of weatherproof master switches and controls beyond the possible fire zone of a recycling plant permits regulation of the various sections, or complete shutdown in case of emergency, without subjecting plant personnel to possible hazard.

PLANT FIRE PROTECTION

One such grouping is illustrated, the conduits from the various units being brought underground to the centralized panel, consisting of a steel frame mounted on a concrete base which, instead of being a broad unit, is cast

KEEP WIRE LINES CLEAN

WITH THE NEW

Patterson-Ballagh

WIRE LINE WIPER

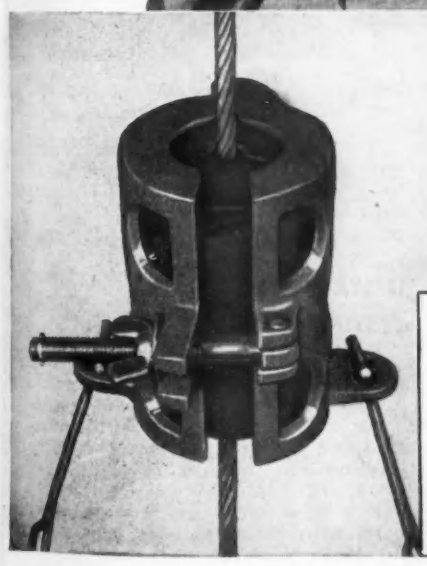
This new style, easy to install PATTERSON-BALLAGH Wire Line Wiper is designed for the effective wiping of mud or oil from the wire line being withdrawn from drilling or producing oil wells.

The wiping element is a one-piece, spirally molded unit made from P B X synthetic rubber. It effectively grips the line with a minimum of friction. No seams are exposed. No metal contacts the line. There is nothing to create a fishing hazard. No delays, as the wiper automatically disengages when the tool emerges from the hole.

See Composite Catalog

PATTERSON-BALLAGH

LOS ANGELES 1 • HOUSTON 10 • NEW YORK 6



PATTERSON-BALLAGH WIRE LINE WIPERS

Features

1.—Latch provides adjustment for wear and easy replacement of refill

2.—Spring release if hit by bailer

3.—Open bottom so bailer or tool will not strike metal when pulled

4.—Replaceable wearing element

5.—All steel construction

6.—Wiping is complete as refill is a *one-piece* spiral

Clean Out with a MILLER Sand Pump

Refer to Composite Catalog page 1907 for description and prices.

Miller Sand Pump Co.

P. O. BOX 4516

OKLAHOMA CITY 9, OKLA.

BETTER *Steel Forgings* for CHRISTMAS TREE FITTINGS

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WELL WORKS COMPANY

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KEEP YOUR WELL CONTROL and COMPLETION OPERATIONS OUT OF THE RED . . .

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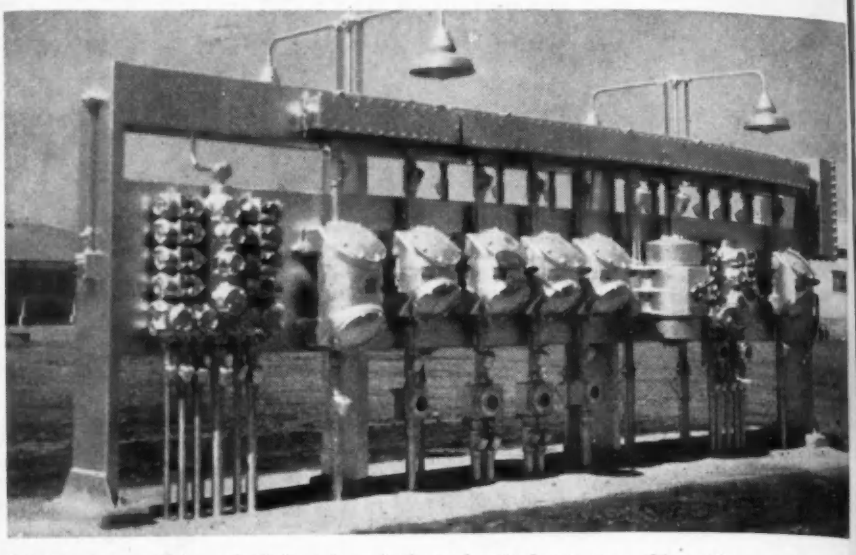


Bringing power leads and all branches of plant electrical system to this outdoor panel permits operation and shutdown from safe distance in case of explosion or fire within cycling plant buildings.

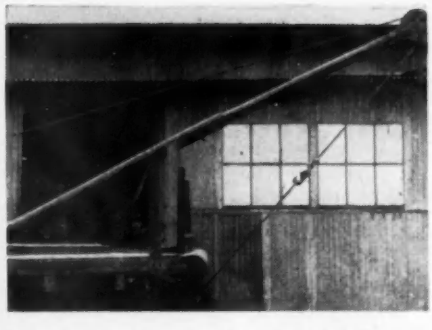
with the central portion open so that individual leads may be changed without requiring disruption of the concrete and possible injury to adjoining lines.

The main current leads are brought in at one end, and carried through the distribution box with all save the two lighting outlets downward, simplifying the waterproofing of the setup, and adding to the neatness of the job.

Boom Support Saves Topping Lift Stresses

EQUIPMENT HANDLING

An extensible gin pole for use with oil field construction equipment has been built by one contractor. This type of boom has been found very useful in such operations as bolted tank erections, platform and stairway erections and light pipeline work. The extensible feature of the boom makes it adaptable to these various jobs yet highly portable. The frame supporting the boom is made from 3-inch steel channel and is constructed to fit on a standard truck bed. Being bolted down to the truck bed it is easily removed when there is other use for the truck. The



Fitted to rear bumper of truck body, this support protects road lifting equipment from shock.

main telescoping mast is made from 4-inch extra heavy pipe and is about 6 feet long. The extensible boom is made from 3-inch extra heavy pipe and is about 10 feet long. The 3-inch pipe slides freely within the 4-inch pipe. 1⅛-inch diameter holes are placed at 10-inch intervals in the upper end of the 4-inch pipe and in the lower end of the 3-inch pipe. A 1-inch pin can be inserted through the two pipes when any pair of holes line-up. Thus a variable length of boom can be obtained.

Handy Recorder Stand Speeds Routine Checks

Heavy plate, set on rigid pipe post, with pressure lead nearby, facilitates checking of units.

INSTRUMENT TESTING

To provide for a quick check of gauges and recording instruments used in a recycling plant and keep all except repair jobs from the shop, one plant installed a test stand near the bank of recorders. Pressure lines are brought to this point and the lines are equipped with inspectors' gauges, these latter checked periodically against dead-weight testers.

An instrument stand is attached to the testing unit, with provision for leveling the recorder mounted thereupon. The entire unit is carried on a heavy pipe post, set into a concrete base, with the steel table top or working plate of heavy steel.

This New IDECO SPEEDBLOCK ...will save you time and money

...at No Extra Cost. A 125 ton traveling block, built especially for drilling under a mast.

It is streamlined and narrow, it eliminates fouling of mast braces or workmen's clothing.

It may be close-coupled to a triplex hook, providing compact, minimum length assembly.

It may be equipped with a bail for attachment to a standard hook.

It is rugged, convenient, safe, economical and Speedy.

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IDECO

OIL FIELD EQUIPMENT AND SUPPLIES

Acute Housing Shortage Slows Up Drilling

Federal agencies hear pleas of industry groups and develop procedure that may offer badly needed relief

By A. R. McTEE, Staff Writer

ACUTE shortage of housing accommodations appears certain to limit further development and exploration in many of the oil fields and prospective areas of District 3 through next year unless early relief is obtained. Suitable living quarters are not available in numerous localities and they must be provided if full use is to be made of manpower. It is generally agreed that the total of wells drilled in 1944 will be somewhat reduced because of this situation. With more wells requested by PAW for 1945, the housing shortage becomes a major problem.

The most recent effort to get relief was made by the American Association of Drilling Contractors. A resolution directed to W. M. Averill, director of PAW for District 3, stated the situation surrounding the critical shortage of housing facilities has been impeding the drilling program requested by PAW in West Texas and Southwest Texas and that individual drilling contractors have exhausted all means toward relief. PAW was asked to "intercede with diligence and haste in laying this matter before proper governmental authorities to the end that corrective measures be taken."

As a specific suggestion, the Drilling Contractors' Association mentioned the construction of small, inexpensive houses or the establishment of trailer camps. Districts in Texas where this type of accommodation was recommended include Falfurrias, Brooks County; Alice, Jim Wells County; Odessa, Ector County; Kermit, Winkler County; Fort Stockton, Pecos County; Andrews, Andrews County; Seminole, Gaines County; Brownfield, Terry County; and Levelland, Hockley County.

Suggested Solution

Averill has made recommendations on this resolution to the regional representative of the National Housing Agency in Dallas. It is understood that the Dallas office of the National Housing Agency has, or soon will, make recommendations to headquarters in Washington on some of the districts mentioned in the resolution, and that additional housing units will be asked.

This effort, however, covers only a few of the places where the need is urgent. All of District 3, the most important oil-producing area in the United States and perhaps the world on account of the military need for oil, is confronted with the problem. The far-reaching effects of the housing shortage are obvious when it is realized what is expected from District 3 next year. Alabama, Mississippi, Louisiana, Arkansas, Texas and New Mexico are scheduled to provide 10,000 of the 27,000 quota of wells set by PAW. West Texas will contribute more heavily than any other area.

Approximately one third the rotary rigs in operation in the United States on September 1 were in the Permian Basin area of West Texas, served by Midland and Odessa. In addition to the extra number of wells expected to be drilled, six additional carbon black plants have been authorized for construction in this territory to supply carbon black for synthetic rubber. Each will be in connection with a gasoline plant which must be built or enlarged for the purpose. It has been estimated that ten new rigging and drilling contractors and related industries are moving into the locality each month. Five new oil field machine shops are under construction now.

In short, a need for about 700 additional workers in the Midland-Odessa district exists now. There is not a single house or apartment available to house these workers, therefore no additional workers may be brought in.

Pecos County Problem

In the Pecos County district of West Texas, of which Fort Stockton is a main supply center, recent discoveries have given an unprecedented impetus to drilling activity. On September 1, 59 wells were in operation or to be started in the immediate future. But labor requirements have been impossible to meet because of the housing shortage. Workers have had to drive long distances with the resulting problem of automobiles, gasoline and tires. At this time, in Fort Stockton, requests are on file for approximately 150 family units.

The situation is equally bad in other parts of District 3. In Mississippi, the border state in the great exploratory trend in progress throughout southeastern United States, one drilling contractor was unable to find a single house for members of his crews and their families. He has contracts signed for drilling six wells, but they cannot be started until the housing problem is solved.

In Southwest Texas, on the other end of District 3, another contractor says he could have twice the present number of rigs running if members of drilling crews could find places to live.

These instances are widely enough scattered to show that the housing shortage is not local and that work is being slowed in more than one locality. A real remedy for the problem will require much cooperative effort, from the applicant for priority to build a house to the War Production Board that controls materials. No single agency can accomplish much working alone.

The National Housing Agency office in Dallas, for example, must work in conjunction with PAW to expedite efforts. Initially, WPB delegated to NHA the responsibility of providing all essential in-migrant war workers the necessary housing acommodations in critical war production areas, as explained by the regional representative. But because of difficulties involved in obtaining factual information concerning labor requirements, particularly in-migrant labor requirements of widely scattered oil field operations, WPB, NHA and PAW jointly developed a procedure to provide permanent and duration types of housing for workers. The procedure involves four specific points as follows:

Procedure Developed

1. *On-lease housing:* All housing for employes of petroleum operators to be constructed on or immediately adjacent to land leased by operators for the discovery, development, and depletion of petroleum resources will be constructed either by the operator or by the operator's employes. An operator may use his regular allotment symbol and preference rating for construction of housing on lease holds, and under Direction 1 to WPB P-98-b, an employe of an operator is authorized to use a preference rating and allotment symbol. An employe of an operator will be required to secure approval of the appropriate PAW District office before applying the rating for using the allotment symbol authorized in Direction 1 to WPB Order P-98-b.

2. *Off-lease housing — constructed adjacent to the leasehold in communities of less than 2500 population:* Where housing in connection with the discovery, development, and depletion of petroleum resources is to be constructed by the operator or by an employe off the lease but in a community having less than 2500 population, PAW may grant authority for the construction when application for construction is submitted by the employer or employe to PAW on Form WPB 2896, accompanied by a justification of the need. Before approving these applications, PAW will obtain approval of the NHA regional representative when the construction is to be in an urban center of less than 2500 population.

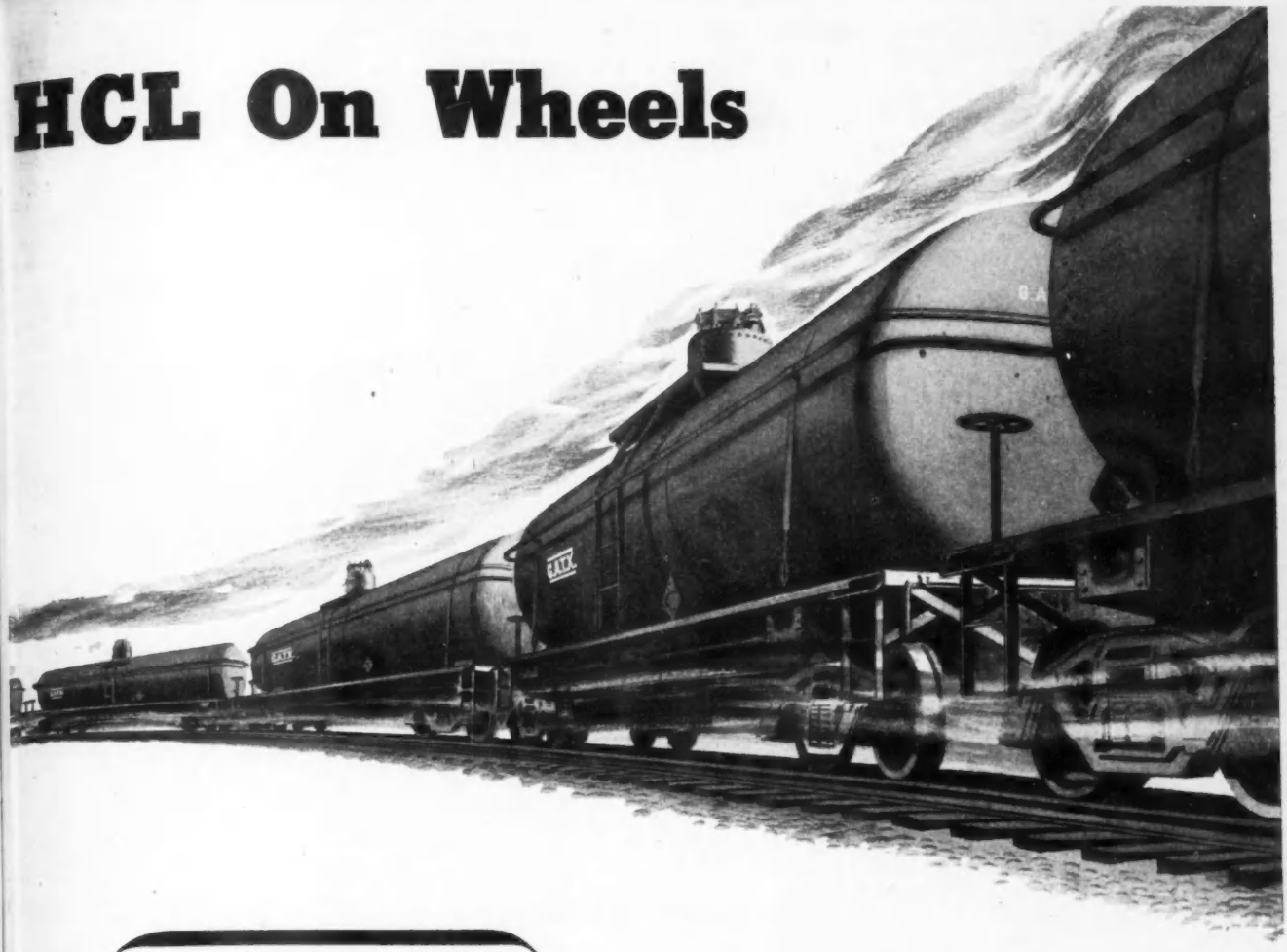
3. *Off-lease housing to be constructed in urban centers having more than 2500 population:* Where housing in connection with the discovery, development, and depletion of petroleum resources is to be constructed in an urban center having more than 2500 population, it is necessary that a quota be established through the approval of a housing program.

Establishing a Quota

To establish a quota of units for such a locality it is necessary that the operators of the area furnish the NHA regional representative with

a. Number of employes presently employed;
b. Number of additional employes required;
c. Income range, race, and sex of

HCL On Wheels



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Your future products may present similar transportation problems, may need tank cars with newly developed linings or coatings. Look to General American for cars scientifically designed to fit *your* needs—and built with the reliability for which General American is internationally known.

GENERAL AMERICAN TRANSPORTATION CORPORATION

Builders and Operators of Specialized Railroad Freight Cars ★ Bulk Liquid Storage Terminals ★ Pressure Vessels and other Welded Equipment ★ Aerocoach Motor Coaches ★ Process Equipment of all kinds ★ Fruit and Vegetable Precooling Service

both present and additional employes, in the following income classifications: Under $1200 per annum; $1200 to $1800 per annum; $1800 to $2400 per annum; over $2400 per annum, and,

d. The number of employes commuting more than 20 miles, together with those in the immediate area but considered inadequately housed. The number shown in these classifications should be broken down by race and sex and have their incomes indicated.

Upon receipt of the above information from the operators, a housing program of recommendations for the number of units needed can be submitted and approval obtained. This will establish a quota of units against which applications can be made by the operators or the employe to obtain authority to begin construction and preference rating to obtain materials by submitting completed form WPB 2896 to the district FHA office.

4. *Trailers or mobile housing:* Authority for the purchase of trailers or mobile housing units from manufacturers can be obtained either by the operator or by the operator's employes in the same manner as indicated under (1) above.

Trailers or mobile housing units owned by the NHA may not be purchased by operators or their employes as yet, since none have been declared surplus, and, therefore, available for sale.

Trailers or mobile housing units owned by the NHA are not available for accommodation of workers of oil field operators on a rental basis except in rare cases where it can be conclusively shown that if they are not provided, some specific phase of the immediate essential war production program will be adversely affected by the lack of housing which cannot otherwise be provided.

This month, WPB and NHA announced relaxation of restrictions designed to "permit builders to make use of materials and equipment as they become available." Any NHA office can give full details on these relaxations.

PAW Relaxes Rules

PAW has also gone as far as it can in relaxing its rules and regulations pertaining to materials. Recently an amendment to P-98-b was put into effect in an attempt to make it easier for oil industry workers to obtain priorities assistance. This amendment permits the use of the regular Order P-98-b maintenance and repair procedure for the upkeep of houses owned by petroleum operators in all branches of the industry and occupied by their employes. A similar privilege, providing for a special material priority, is extended to housing owned and occupied by employes of petroleum operators if it is on or adjacent to an oil or gas lease.

For the construction of housing on or adjacent to a lease, an operator may use the regular production rating of Order P-98-b. An employe of a petroleum operator may apply for authority to construct housing by writing to the PAW district office for the district in which the proposed housing is to be erected.

The employe's letter requesting construction permission should be marked "Ref. P-98-b" and contain the following information: Name and address of the applicant and of his employer, location of the proposed housing, description of the work to be done, name of land owner, reason house is necessary, other work (such as grading) required, utility connections required, and estimated date when the work will be begun and finished.

Operators engaged in pipe line operations must obtain approval to use materials for housing by filing PAW Form 30 with the appropriate PAW district office.

It must be remembered, however, that any housing other than actual lease equipment is governed by Order P-55-c, which defines what can be built under present restrictions. This order can be obtained from any NHA office and its provisions must be followed in undertaking construction off the lease.

Materials Problem

When all this is done there still remains the problem of materials. Some manufacturers of ready-built houses say that obtaining the necessary materials is very difficult. A large concern in Houston, for example, has built only 20 houses for use in connection with the oil industry during the past 90 days because materials cannot be had.

The cure for this situation is not known. The Army and Navy have reportedly accumulated extremely large stockpiles of lumber at various points in the country in anticipation of war needs. Of course, if all this material is needed for conduct of the war, it should not be disturbed. However, there is a strong probability that much of it will eventually be sold as surplus. Lumber manufacturers must sell at least a third of their output to government account now. If it were possible to divert more lumber to civilian uses, the housing shortage in the oil fields and prospective areas might be greatly relieved. NHA and PAW could be of great service to the oil industry by making available a better supply of building materials.

To make the best of a bad situation, various expedients are being used by contractors and companies. In some instances in West Texas where long distances are traveled by crew members, companies have undertaken to provide cars for key men. Also, companies helping their men keep gasoline and tires where it is necessary to drive considerable distance to work.

Where houses have been attempted, as much use as possible has been made of substitute materials, or building materials other than lumber. Also, the size of such buildings have been held to the minimum, and the needs estimated on an average, rather than the maximum number of occupants to stretch building materials.

Where possible, labor has been recruited in the vicinity of operations, which has been the most satisfactory policy. However, in some cases, it has been found that shortage of gasoline and tires has affected the labor turn-over, even where workers lived close to their jobs.

House Boats Used

In the Gulf Coast, house boats help to meet the problem, especially in Louisian where much of the travel is by water.

To further alleviate conditions, oil operators can assist any private builder to get the highest priority housing rating. PAW is ready to lend its full assistance in establishing the need for such rating, especially with employes of oil companies, or companies themselves.

Operators and contractors can also help by informing local groups such as chambers of commerce of the need for additional housing in localities new to the oil industry, and working with them to obtain priorities.

To meet the need for temporary shelter, in exploratory work for example, trailer camps in the nearest town or village would perhaps be the most feasible answer.

Since these are difficult to obtain from NHA, something might be done to ease the procedure and make these units more available. It can be shown beyond any reasonable doubt that the lack of housing facilities is hampering exploratory work in the oil industry. If there is a supply of mobile units, surely the routine of obtaining them could be so simplified that they could be available quickly, as needed. Where individuals are able to buy such trailers, everything possible should be done to see that gasoline and tires are made available to move and operate the trailers.

A survey of war industries in the vicinity of fields or exploratory work has yielded acommodations in a few instances, and houses around such plants will be vacated as cut-backs are announced.

Texas November Allowable In Excess of PAW Figure

The Texas Railroad Commission has ordered a November allowable of 2,285,303 barrels daily for all oils, 7303 barrels in excess of the PAW recommendation. Principal changes were in West Texas, which was cut 17,897 barrels and the Gulf Coast area which was raised 17,114 barrels. The figures included 146,918 barrels of distillate and natural gasoline as compared with 147,700 for September.

The commission cut the East Texas allowable from 378,140 to 374,632 barrels, this by reducing from 24 to 23 the number of producing days. The Panhandle was exempt from shutdowns and had a daily allowable of 12,385 barrels.

The commission raised Tom O'Connor 6421 barrels to 63,335 barrels. In the Gulf Coast, Anahuac was raised approximately 2500 barrels to 33,293 barrels. Fig Ridge was raised 400 barrels to 8800 barrels; Hastings was raised 4000 barrels to 64,700; Webster was raised 3000 barrels to 64,000 barrels. There were other minor changes in the Gulf Coast district. Van was raised 1000 barrels to 36,303 barrels and Hawkins was raised 1450 barrels to 44,854 barrels.

To effect the cut in West Texas, the commission cut Seminole 1945 barrels to 24,483 barrels, Slaughter was cut 11,092 to 66,094 barrels, Wassom was reduced from 10,630 to 69,094 barrels and Yates was cut 2835 to 39,694 barrels.

The commission announced that the state as a whole would be allowed to produce for 24 days.

Coyne Petition Denied

The United States Supreme Court has denied a petition filed by defendants to hear the Coyne royalty apportionment case which has been in federal court since 1940.

Simrall Corporation of Mt. Pleasant, Michigan, brought the suit as an interpleader to determine the legal elaimants to royalties on the Coyne lease, originally leased by The Carter Oil Company and farmed out to Maguire, Inc.

HARDENED AND HONED BARRELS which outwear regular barrels 2 to 5 times make oilmaster Pumps masters of all oil pumping problems

Each one of the following pumps is master of the conditions it was built to meet, and is equipped with *hardened and honed barrels.*

oilmaster IMPROVED INSERT

A ruggedly constructed precision built pump for ultra deep well pumping.

oilmaster VOLUME PRODUCER

The largest volume insert type pump with hardened and honed barrels.

oilmaster PETROL A

For lowest cost production for stripper wells (1 1/16" bore only).

oilmaster FLUID PACKED

The all purpose 3-tube pump for troublesome wells. (Usually comes with regular precision tubing, but hardened barrels are available for deep pumping service.)

oilmaster CUP

The improved cup type pump, with individual anchoring of each plunger cup.

oilmaster RING

The effective sealing composition individual anchored ring-type pump.

oilmaster TUBING LINER

A standard sectional tubing liner pump for volume conditions (Hardened cast alloy liners).

Every operator—large or small—who wants to cut lifting cost will find a ready solution in "Oilmaster" Pumps—the Pumps featuring hardened and honed barrels.

Consult our service men for complete information and help on your pump problems.

Cross sectional view of the improved insert pump barrel showing how super-hard wearing surfaces for long life are combined with ductile care for toughness.

Here's an outstanding achievement of modern metallurgy—a one-piece pump barrel which is both hard . . . and tough! While most pump barrels are either hard (and brittle) or tough (and not so hard), Oilmasters combine both these important advantages in one barrel. They have a super-hard wearing surface which measures 64-70 on the Rockwell C scale, and a tensile strength of 145,000 p.s.i.—all in the same piece of metal!

There is no need to use pumps with untreated barrels when you can get 4 to 8 times harder barrels that wear 2 to 5 times longer. Why be satisfied with untreated barrels, when Oilmaster pumps equipped with super-hard barrels, cost no more than pumps using cold drawn barrels? Get the complete story on how Oilmaster hardened and honed barrels increase pump life!

The unprecedented hardness measurements of Oilmaster hardened and honed barrels (shown in the accompanying chart) account for the outstanding performance records of Oilmaster Pumps.

	BRINELL	ROCKWELL
Oilmaster Hardened and Honed Pumps	627	64-70-C
Untreated Steel Pumps	150 to 170	6-14-C

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PIPE LINE REVIEW

Permit Sought for Line To Tap Tennessee Trunk

Construction of 66 miles of 10¾-inch pipe line between Tennessee Gas and Transmission Company's pipe line near Enville, Tennessee, and Muscle Shoals, Alabama, to cost $1,350,186, is contemplated in an application filed with the Federal Power Commission by the Alabama-Tennessee Natural Gas Corporation, Florence, Alabama, to make natural gas available to the Tennessee Valley Authority at Muscle Shoals, the Reynolds Metal Company at Listerhill, Alabama, and the National Utiliites Company at Florence, Sheffield and Tuscumbia, Alabama.

Contract to Recondition Oklahoma Line Awarded

Shell Pipe Line Corporation has awarded contract to Smith Contracting Company for the reconditioning of 52 miles of 6-inch double line between Tonkawa and Cushing, Oklahoma.

Plans are to take 17 miles of single line out of service for reconditioning at each time, leaving 17 miles of single and 35 miles of double line to carry the oil until the entire line has been reworked. The line is carrying a pressure of 750 pounds but after part is reconditioned the pressure can be raised to 900 pounds.

The entire line is screwed but in the reconditioning the collars will be cut out and the line welded. The estimated cost of the job is $500,000, or approximately ½ the cost of the line when new.

Line Planned to Furnish Gas for Long Lake Plant

Anco Gas Corporation, Dallas, will provide additional casinghead gas for its natural gasoline and recycling plant in the Long Lake field, East Texas, by connecting with 14 wells owned by the Tex Harvey Oil Company in the East Long Lake pool.

The new supply will be tapped by laying 4½ miles of 5½-inch gathering line, and an equal size line to return residue gas for lease operation.

Survey Made for Natural Gas Line in East Texas

Lone Star Gas Company, Dallas, has made preliminary survey for a 105-mile large-diameter natural gas line from Trinidad junction of its East Texas gathering system to the Carthage field, Panola County.

This project was authorized after the company negotiated a contract to purchase gas from the Carthage field holdings of Rogers Lacy, Longview operator. Lone Star Producing Company, subsidiary of the Dallas firm, and Lacy will transfer their jointly-owned natural gasoline and recycling plant in the Willow Springs deep gas-distillate field, adjacent to the East Texas field, for service in the Carthage area.

This plant can handle in excess of 50,000,000 feet daily, and return a minimum of 40,000,000 feet daily to the producing zone. Condensate production in the Willow Springs area will be handled by individual separators at the well.

Lone Star Gas Company has awarded contract to Anderson, Brothers, Malvern, Arkansas, for the construction of a recently authorized 15-mile, 8-inch extension of its East Texas system into the Navarro Crossing field, and 14 miles of gathering lines.

Work Begins on 18-Mile Line from Cranfield Pool

Work is under way on Oklahoma Pipe Line Company's 18 miles of 8⅝-inch crude oil line from the Cranfield, Mississippi, pool to Standard Oil Company of Louisiana's barge terminal at Gibson Landing on the Mississippi River. O. C. Whitaker of Fort Worth has the contract.

Expected to move about 20,000 barrels of oil daily, the line is to go into operation about December 1.

4½-Mile Line in East Texas Field Being Constructed

The Sabine Valley Gasoline Company, owner of a natural gasoline plant in Gregg County, East Texas field, is building a 4½-mile, 2-inch products line from the plant to a 3-car rack on the International and Great Northern Railway between Kilgore and Longview to expedite shipments of butane and propane.

The company is currently producing 19,000 barrels and 600 barrels, respectively, of the latter products monthly. Hanlon & Buchanan, Inc.'s original 10-year contract to market the output of the plant will expire in 1945.

Portable Equipment Moves Oil from West Edmond Pool

Cimarron Valley Pipe Line Company's crude oil trunk line from the West Edmond pool is running 1800 barrels an hour through portable pumping equipment installed at its Banks pumping station which was destroyed by fire October 15. This is slightly more than moved through the line before the fire. Meanwhile, Phillips Petroleum Company and Sohio Petroleum Company are laying 21 miles of 8-inch line from the pool to Oklahoma City and oil is expected to be flowing by the end of November.

Work on 3-Mile, 4-inch North Texas Line Begun

Sinclair Refining Company, pipe line division, has begun a 3-mile, 4-inch crude line that will connect the prolific Mississippian discovery by Hanlon & Buchanan, Inc., near the East Bryson field, Jack County, to its North Texas system.

☆

LIEUT. GROVER J. GEISELMAN, United States Naval Reserve, at the request of Petroleum Administrator Harold Ickes, has been assigned to PAW, District 3, and stationed at the Houston office, where he is assisting in the natural gas and gasoline division. Before entering the armed forces he was a partner in the Production Service Company.

Wyoming Pipe Line Work To Be Completed Soon

Relocation of approximately 33 miles of 12-inch crude oil line between Welch and Casper, Wyoming, to be operated by Stanolind Pipe Line Company, is about one third complete and the line is expected to get into operation November 15. I. C. Little of Dallas, Texas, has the contract to take up the pipe which originally ran from Welch to Salt Creek. This line was laid about 1922. Laying of the line was contracted by Eastern Construction Company.

Pipe Line Practices Set Forth in New Book

A new vocational-training course entitled "Oil Pipe-Line Transportation Practices," identified officially as "Vocational Training Course No. S-6 of the Petroleum Industry Series," has been completed and is available at $3 per copy from the Division of Extension, University of Texas, Austin, Texas, the Division of Production of the American Petroleum Institute has announced.

This course is the result of work by a special committee headed by L. E. Davis of Sinclair Refining Company, pipe line department, Independence, Kansas, in cooperation with O. H. Beaty of the Kansas State Board for Vocational Education; is sponsored by the Division of Trade and Industrial Education of Kansas under the direction of State Supervisor Laurence Parker; and is published by the Bureau of Industrial Teacher Training, Division of Extension, of the University of Texas, under the supervision of Acting Director of Industrial Education Charles Cyrus.

The publication consists of 14 individual chapters, each prepared by especially qualified authors experienced in the specific subjects covered.

Joint Development Program Back of Hugoton Transfers

An exchange of interests in acreage in the Hugoton gas pool owned by Helmerich & Payne, Inc., of Tulsa, and the National Refining Company, has been effected in order to promote a joint development program. Approximately 20,000 acres of proved leases located in Kearny, Finney and Haskell counties, Kansas, were involved. Helmerich & Payne, Inc., holds an estimated 75,000 acres of leases in the gas reserve and are drilling four wells in the area with 10 other wells projected. The firm operates a gathering system in the field and sells natural gas to the Northern Natural Gas Company.

☆

ALLEN B. GIBSON has joined the PAW staff, District 3, Houston, as assistant director of production, having been transferred from the Washington office of PAW. Gibson was division engineer for Cities Service Oil Company for the West Texas-New Mexico division for 7 years before joining the faculty of the University of Oklahoma in February, 1941, as assistant professor of petroleum engineering.

Crude Production and Refinery Runs Up; Gasoline and Light Fuel Go to Storage

Increases in both crude production and crude runs to stills in the week ended October 21 resulted in expansion of refinery output of gasoline and residual fuel oil and favorable effect on stocks. The inventories of gasoline were increased, and so were those of gasoil and distillate fuel oil, although production of the latter oils declined somewhat. Residual fuel stocks were drawn upon in spite of increased production.

U. S. crude oil production of 4,744,000 barrels daily was 18,000 a day more than in the previous week and within 18,000 of the record high of the final week of September. It was 335,000 barrels a day or 7.6 percent higher than production in the week ended October 23 last year. Crude oil stocks increased 374,000 barrels during the week ended October 14 and then totaled 222,874,000 barrels, an amount 11,123,000 barrels or 4.8 percent less than the 233,997,000 barrels held on the corresponding date last year. Crude runs to stills averaged 4,662,000 barrels daily in the October 21 week, up 73,000 from the week before and 481,000 daily or 11.5 percent more than the 4,181,000 a day processed in the like week last year.

Production of gasoline, including natural blended at refineries, averaged 2,080,000 barrels daily in the week of October 21, up 17,000 from the week before and 269,000 daily or 14.8 percent more than production in the corresponding week last year. This output permitted accumulation of 51,000 barrels daily in storage, which rose to 78,866,000 barrels, a volume 10,438,000 barrels or 15.3 percent greater than that of 68,428,000 barrels reported for October 23 last year.

Gasoil and distillate fuel oil production of 719,000 barrels per day was 53,000 daily below the previous week's output but 45,000 a day or 6.6 percent more than that in the corresponding week last year. Stocks increased at the rate of 146,000 barrels daily and rose to a new high for this year at 48,360,000 barrels. That amount was 5,240,000 barrels or 12.2 percent more than the 43,120,000 barrels held a year previously.

Residual fuel oil production of 1,270,000 barrels per day was 9000 daily more than in the previous week and 172,000 a day or 15.7 percent more than output in the like week last year. Stocks were reduced, however, by 60,000 barrels daily, having declined to 63,944,000 barrels. The later quantity was 872,000 barrels or 1.3 percent under the 64,816,000 barrels of October 23 last year.

Natural Gasoline Output In August Gains Over July

Production of natural gasoline and allied products in August averaged 11,641,000 gallons daily, a 34,000-gallon increase over July, with the increase centered largely in East Texas, Illinois, California and Wyoming, it was reported by the United States Bureau of Mines.

Production of light products during the month, the bureau announced, included 191,940,000 gallons of natural gasoline, against 191,814,000 gallons in July; 76,944,000 gallons of cycle products, against 77,322,000 gallons; 16,422,000 gallons of iso-butane at natural gasoline and cycle plants, against 16,926,000 gallons; 75,558,000 gallons of other liquefied petroleum gas at natural gasoline and cycle plants against 73,752,000 gallons; 14,028,000 gallons of liquefied refinery gas at refineries against 13,104,000 gallons; and 8,400,000 gallons of benzol, unchanged.

Stocks continued to decrease, those at refineries falling from 96,852,000 to 93,912,000 gallons during the month and those at plants and terminals dropping from 88,998,000 to 82,950,000 gallons, the bureau stated.

To Award Service Pins

Standard Oil Company of Indiana will award service pins to 511 employes this year. Diamond pins will be presented to seven employes with 40 years of service. Gold pins will go to 81 with 30 years of service, 222 with 20 years, and 201 with 10 years. Standard of Indiana instituted the service pin awards in 1914 in recognition of 20 or more years of service. In 1922 the same plan was effected for 10, 20, 30 and 40 years of service.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.
(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod. Barrels Daily	Crude Oil Prod. Week Ended	Runs to Stills Barrels Daily	Runs to Stills Week Ended	Crude Stocks Barrels	Crude Stocks Week Ended	Gasoline Stocks Barrels	Gasoline Stocks Week Ended	Gasoil and Distillate Stocks Barrels	Gasoil and Distillate Stocks Week Ended	Residual Fuel Oil Stocks Barrels	Residual Fuel Oil Stocks Week Ended
Highs:												
1941	4,337	11–22	4,120	10–18	266,187	3–29	99,727	3–29	[1]54,983	11–15	102,448	1– 4
1942	4,337	2– 7	3,961	1– 3	263,208	3–28	[1]109,281	3–14	47,861	11–14	95,857	1– 3
1943	4,436	11–13	4,331	12– 4	245,752	5–29	94,159	3–20	47,187	11–27	72,881	1– 2
1944	[4]4,762	9–30	[4]4,775	9–30	240,992	1– 1	89,162	4– 1	48,360	10–21	64,644	10– 7
Lows:												
1939	[3]1,601	8–26	3,125	2–18	[2]229,127	10–12	71,152	10– 7	20,722	4–15	105,397	4– 8
1941	3,364	1–11	3,490	1–18	240,399	11–15	79,923	10– 4	28,382	4–12	90,914	7–12
1942	3,297	7– 4	3,393	5–23	231,896	12–12	75,934	12– 5	29,240	4–25	72,962	12–26
1943	3,821	1– 9	3,579	3–13	232,191	1– 9	68,182	10–16	30,732	4– 3	57,596	12–25
1944	4,357	1– 1	4,228	2–12	[4]220,623	9– 9	76,302	1– 1	30,232	4–29	49,737	3–18

TRENDS OF 1943 AND 1944

Trends in Week Ended:	Crude Oil Production Daily	Crude Oil Runs to Stills Daily	Crude Oil Stocks Week End	Gasoline Production Weekly	Gasoline Stocks Week End	Gasoil and Distillate Production Weekly	Gasoil and Distillate Stocks Week End	Residual Fuel Production Weekly	Residual Fuel Stocks Week End
1943:									
January 2	3,871	3,734	233,938	10,957	82,420	4,285	42,913	7,683	72,881
January 30	3,826	3,698	233,863	10,339	88,830	3,888	37,057	7,452	70,763
February 27	3,873	3,709	235,217	10,566	93,157	4,230	32,939	7,839	70,140
March 27	3,896	3,742	239,126	10,231	94,079	3,541	30,980	8,018	67,938
April 24	3,913	3,737	242,035	10,583	91,001	3,954	31,142	8,168	67,455
May 29	3,970	3,679	245,752	10,656	83,937	3,798	32,274	7,672	67,682
June 26	3,955	4,015	242,657	11,092	79,589	3,876	34,044	8,126	67,960
July 31	4,133	3,788	238,420	11,127	74,977	3,765	36,363	8,478	66,877
August 28	4,196	4,227	236,170	12,420	72,525	4,351	37,928	8,732	67,250
September 25	3,344	4,156	233,013	12,206	70,024	4,608	40,328	8,560	66,659
October 30	4,383	4,176	247,219	12,813	69,297	4,642	44,591	7,968	63,833
November 27	4,414	4,261	239,761	12,638	69,980	4,379	46,187	8,633	62,143
December 25	4,363	4,185	241,310	12,597	74,024	4,457	43,791	8,689	57,596
1944:									
January 1	4,357	4,453	240,992	13,192	76,302	4,575	42,310	9,141	57,330
January 29	4,409	4,359	240,251	13,427	81,085	4,054	37,266	8,889	52,857
February 26	4,423	4,377	237,137	13,183	85,248	4,558	33,766	8,952	51,387
March 25	4,385	4,443	236,285	13,362	87,287	4,979	31,319	9,013	51,669
April 1	4,383	4,435	234,667	13,824	89,162	4,450	30,530	8,367	51,326
April 29	4,431	4,300	235,342	13,126	88,462	4,284	30,236	8,398	49,985
May 27	4,514	4,532	234,423	13,502	86,468	4,702	32,035	8,568	49,812
July 1	4,587	4,638	228,860	14,052	83,559	4,496	35,360	8,872	52,235
July 29	4,608	4,627	225,112	14,115	82,665	4,833	38,135	8,900	56,280
August 26	4,667	4,698	222,931	14,112	80,740	4,566	41,453	8,680	59,839
September 30	[4]4,762	[4]4,775	222,393	14,494	78,028	4,622	45,329	9,292	64,226
October 7	4,691	4,506	222,500	14,252	78,554	4,706	46,078	8,676	64,644
October 14	4,726	4,589	222,874	14,442	78,506	5,398	47,335	8,827	64,365
October 21, 1944	**4,744**	**4,662**	.....	**14,559**	**78,866**	**5,03C**	**48,360**	**8,889**	**63,944**
October 23, 1943	4,409	4,181	[5]233,997	12,678	68,428	4,717	43,120	7,685	64,816
Change:									
In week	+18	+73	+374	+117	+360	−368	+1,025	+62	−421
In year	+335	+481	−11,123	+1,881	+10,438	+313	+5,240	+1,204	−872
In year	+7.6%	+11.5%	−4.8%	+14.8%	+15.3%	+6.6%	+12.2%	+15.7%	−1.3%

[1] All time peak. [2] Lowest between January, 1922 and July 1, 1944. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent states. [4] Lowest since December, 1921. [5] Stocks, October 16, 1943.

International Developments

Jarahueca Field Studied By American Companies

Continued successful development of the Jarahueca field, in the east-central part of Santa Clara province, Cuba, is being studied by American oil companies.

Since the discovery of the field in October, 1943, 12 producing wells have been completed, and 2 more are underway. Cuban capital is responsible for the enterprise.

Outside interest in the field is mostly due to the fact that the well logs show an almost continuous section of serpentine rock all the way down to the producing zone, where oil is encountered in fractures in this same type of rock. While it is obvious the oil has migrated from another source, the actual geology of the oil occurrence has not been satisfactorily explained.

Jarahueca oil is essentially of distillate quality, according to reports, and can be used as a low-grade motor fuel without special processing.

Russians Negotiating for Iran Exploration Rights

Russia is negotiating with Iran for exploration and exploitation rights on lands adjacent to the Caspian Sea, according to a dispatch from Moscow. The negotiations have been confirmed by Sergei I. Kavtaradze, vice commissar for Foreign Affairs, a report from Teheran revealed.

Soviet interest is particularly directed toward acquisition of rights in the Samnan area, east of Teheran, where the Russian-capitalized Kavir Khorian Oil Company completed a discovery well before the Russian Revolution. No further drilling development has since been undertaken in the area. Nearest commercial production is at Chikishlar, just across the Atrak River in Russia, 150 miles to the north, although Amiranian Oil Company put down a wildcat which struck oil near Asterabad, on the Persian side of the border, several years later. This discovery, likewise, has not been further developed, although plans were under way before the war to lay a pipe line from Asterabad to Chahbar, on the Gulf of Oman, a distance of 900 miles.

American oil company officials do not regard the Soviet-Iranian negotiations as any threat to their interests or plans, since the region involved is no longer of interest to them because of its remoteness and inaccessibility.

Oil Interests Maneuver For Advatage in Persia

Negotiations aimed at securing oil exploration and development concessions in the Laristan, southern Kirman and Baluchistan areas of Persia, adjacent to the Strait of Oman and the Arabian Sea, are reported at a critcal stage, with American and British embassies, the Persian government and representatives of British Shell Oil Company, Inc., Standard Oil Company and Sinclair Oil Company interests all jockeying for advantage.

The situation is further complicated because the strong Nationalist Group in the Iranian Parliament is opposing any further granting of concessions except to Persians. This party insists that Persia is now capable of developing and operating its own oilfields, particularly so now that the Allied military services have created modern ports along the coast, to handle supplies to Russia. These port facilites are to be turned over to the Persians at the end of the war.

In the meantime, Persian authorities are being advised by Herbert Hoover, Jr. and A. A. Curtice, of United Engineering Corporation, who are serving as experts to the Persian government in setting up the terms of possible concession contracts that will represent maximum returns and benefits for Persia.

About 80,000 square miles of prospecting territory is involved, in which seepages are common, and where salt domes and prominent anticlinal structures occur in profusion. The area is conceded to contain tremendous petroleum reserves, although no attempts have been made to develop them.

Pando Wildcat Abandoned

Mene Grande Oil Company abandoned its Pando 1 wildcat test in central Anzoategui, Venezuela, at 6900 feet. This wildcat is 8 miles from the main Oficina field and the undeveloped Areo discovery.

In the Delta Amacuro area, Texas 2, wildcat of Texas Petroleum Company of Venezuela, was at 7934 feet October 9. The same company's semi-wildcat Rincon Largo 3 was at 7569 feet and was drilling after a successful fishing job.

Deep Water Concession

The 60,000 hectare concession far out in Lake Maracaibo, Venezuela, reported to have been obtained in September by the Dutch Shell group, extends from the Tia Juana field area southward, beyond and past the Lagunillas field. It lies from 12 to 25 kilometers from the shore and water depths of 200 feet or more are involved.

Concessions Sought

Concession bids have been filed on ten exploration and exploitation blocks in Venezuela by the Barnsdall South American Corporation. The parcels, totaling approximately 62,500 hectares, are located in the districts of Miranda and Monagas, state of Anzoategui, and Zaraza, in Guarico. The blocks vary in size from 2906 to 10,000 hectares.

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J. L. MATHIEU, of Houston, vice president of Schlumberger Well Surveying Corporation, has returned from a six-weeks' business trip to Venezuela and Trinidad.

HOMER LYNN, assistant to the superintendent of the land department of Magnolia Petroleum Company, Dallas, has terminated eight years of service to operate as an independent in the southeastern states with headquarters at Jackson, Mississippi.

South American Air Trade Prospects Heavy

Indicative of the postwar field for aviation, and its concomitant demand for gasoline, the Department of Commerce estimates cargo potentially available for transportation by air between the United States and the ten South American republics at more than $60,000,000 a year.

This is based on an analysis of United States-South American trade by the department's transportation unit, which has prepared reports of its studies on seven of the ten South American countries.

Electronics Contributions Described at Chicago Parley

Contributions made by electronics in the field of process instrumentation were described in a paper presented at the National Electronics Conference at Chicago by H. D. Middel of General Electric's General Engineering Laboratory.

Defining the term process instrumentation as the measurement and control of so-called process variables such as pressure and temperature, Middel said the application of electronics to this field is in many respects a natural application. Electronic tubes and their circuits by their very nature readily lend themselves to the essential requirements of speed, accuracy, and reliability.

The speaker qualified the claims made for electronics, pointing out that it is unreasonable to believe it will displace to any great extent other mature forms of measurement and control. Rather, electronics has augmented and expanded the electrical method. Consequently, certain measurements can now be made more accurately, and by entirely automatic and continuous means; and, in cooperation with other types of controllers, particularly pneumatic, various forms of measurement and control previously solved only theoretically are now actually possible.

Mineral Map of Oklahoma Is Being Distributed

A mineral map of Oklahoma is ready for distribution by the Oklahoma Geological Survey at Norman, Oklahoma. The map is in five colors, measures 27 by 44 inches, and shows general distribution of 20 mineral raw materials, all important processing plants, many mines, quarries and pits, oil and gas pools, areas offering potential water supplies, and the larger electric generating plants and transmission lines, railroads and highways.

Copies are being placed with Chambers of Commerce in the state and in large northern and eastern cities.

Denver Officers Named

R. G. Rapp was reelected president of Denver Producing & Refining Company at the annual directors meeting. Other officers reelected included H. E. Rapp, vice president; A. L. Schellheimer, treasurer; Stirling Williams, secretary. Directors elected included R. W. Mackey, A. A. Moody, Robert B. Moody and O. T. McIntosh.

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SHERWOOD BUCKSTAFF has succeeded R. E. Shutt, resigned, as manager of the geological and exploration department for Shell Oil Company at Tulsa.

U. S. Field Operations

Oklahoma

Important Wildcat Staked For Cleveland County Test

South of Moore in Cleveland County, Magnolia Petroleum Company has staked a wildcat on a 1900-acre block acquired from W. O. Allen of Tulsa, and plans a 7300-foot test. Anneler 1, CSE NE 26-6n-1w, is north of the Canadian river on location made after geophysical work which indicates two possible structures, one around the wildcat and another in the vicinity of Lexington. Considerable royalty trading has taken place east of township 6n-rlw. Nearest wells to the location are a couple of dry holes in SE SW 11-6n-1e, depth 4209 feet, and SW NE 20-6n-1e, depth 6790 feet. Between the West Moore and Washington pools, Gulf Oil Corporation is drilling below surface pipe in Price 1, CNE SE 17-9n-3w.

West Edmond: Denver Producing & Refining Company's Kuehne 1, NW NW 3-13n-4w, Oklahoma County, extends the pool a location east. Completed in Bois d'Arc at 6654-6726 feet, it flowed 128 barrels of oil an hour during the first five hours. With a 75-foot section of Bois d'Arc, all of the west half of section 3 may be productive. Sohio Oil Company, Anderson-Prichard Oil Corporation, and Gulf oil Corporation each got producers and more than a dozen other wells were testing or in final stages. Producers were in Bois d'Arc and have all been pinched back to 200 barrels daily.

McClain County: After fighting salt water, The Carter Oil Company is completing Johnson 1, CSW SE 30-8n-2w, deep Wilcox sand pool opener in the Noble area for an estimated 10 barrels of oil an hour through ⅛-inch to 1/16-inch adjustable choke and showing a small amount of water. Oil is through perforations at 8190-8200 feet and total depth is 8222 feet. Near Blanchard Carter's Lamar Ranch 1, CNE SW 28-8n-3w, topped the Caney Shale at 9655 feet and was drilling below 9765 feet headed for second Wilcox. Its McBride 1, CSE NW 9-7n-3w, new start in the Washington pool, was drilling below 3600 feet.

Pontotoc County: H. W. Shaw's Logsdon 1, NE NW SE 32-5n-6e, topped Thurman at 1634 feet. Drill-stem test with tool opened 30 minutes recovered 15 feet of oily mud. Drill-stem test of the Cromwell zone topped at 1781 feet with tool opened eight minutes recovered eight to ten million feet of gas. Depth is 1920 feet and wildcat is shut down for spudder.

Logan County: Three miles south of the Northeast Crescent pool, Eason Oil Company has opened a new field, completing Michael 1, SW SW NW 12-17n-4w, for 90 barrels of distillate and an estimated 3,000,000 feet of gas from Layton sand at 4910-35 feet. The sand was shot with 140 quarts at 4909-29 and 4910-35 feet.

Cleveland County: Showings in the Hunton zone are reported in 3 Mid-Continent wells drilling in the South Moore and West Moore pools and headed for the second Wilcox. In South Moore, Mid-Continent's Westermier 2, NE NW SW 26-10n-3w, topped Hunton at 8158 feet, and Brand 1, NE SE SW 26-10n-3w, at 8026 feet. In West Moore, the Tubbs 2, NE NW NE 29-10n-3w, topped the formation at 8173 feet. All wells reported stains and odor. Mid-Continent Petroleum Corporation's Turk 1, SW NE 29-10n-3w, was drilling below 8927 feet. Both areas now look good for production in both Hunton and lower Wilcox.

Carter County: Continental Oil Company completed Fowler 1, NW SE SW 31-2s-2w, new Hunton lime pay opener in the old Graham pool. Bottomed at 8249 feet and plugged back to 5564 feet the well flowed 365 barrels in 4 hours through 1-inch tubing choke with 1100 pounds casing and 110 pounds tubing pressures. The well is shut in for pipe line connection.

Hughes County: Deep Rock Oil Corporation's Bilby 2, NWc 28-7n-10e, in the new Horns Corner pool, was being completed for 200 barrels daily from second Cromwell. The pool, discovered this year, is in an active area with The Texas Company's Turner 1, NE NW NW 8-7n-10e, a completion flowing 242 barrels a day from the Cromwell at 3590 feet. Deep Rock has started Boyd 1, SE NW SW 21-7n-10e and is drilling below surface pipe.

Lincoln County: Sinclair-Prairie Oil Company completed Danker 1 SE NW SE 28-14n-3e, Cleveland sand discovery, 7 miles southwest of Chandler. With casing perforated with 81 shots at 3475-98 feet the well flowed about 200 barrels of 52-gravity oil by heads in the first 24 hours and 150 barrels through 2½-inch tubing in the second period and shut in for pipe line connections.

Missouri

Bureau of Mines Awards Contract for Wildcat

The United States Bureau of Mines, in an attempt to locate a magnetite mass and to obtain subsurface geological information has awarded a contract for a 4000- to 5000-foot wildcat well to the Pioneer Drilling Company of Carmi,

Wells Completed in United States in Week Ended October 28, 1944

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second issue of each month. More detailed data on wildcats published in third issue of each month.

State or District	FIELD COMPLETIONS: New Wells *Oil	Gas	†Input	Dry	Total	Old Wells Deepened	WILDCAT COMPLETIONS *Oil	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	Cumulative: This Year	Last Year
Alabama	....	....	....	1	1	....	....	....	....	....	1	....	32	2
Arizona	....	....	....	....	....	....	....	....	....	....	....	....	6	4
Arkansas	4	....	....	....	4	....	....	....	....	....	4	9	193	219
California	....	....	....	....	....	....	....	....	....	....	....	46	1,678	1,187
Colorado	1	....	....	....	1	....	....	....	....	....	1	....	25	22
Florida	....	....	....	....	....	....	....	....	....	....	....	1	3	4
Georgia	....	....	....	....	....	....	....	....	1	1	1	....	7	2
Illinois	30	....	....	18	48	....	....	....	5	5	53	45	1,628	1,507
Indiana	6	....	....	....	6	....	....	....	2	2	8	14	280	225
Iowa	....	....	....	....	....	....	....	....	....	....	....	....	2	3
Kansas	11	....	....	....	11	....	1	....	9	10	21	35	1,424	1,435
Kentucky	9	....	....	5	14	....	....	....	2	2	16	20	648	341
Louisiana	4	....	....	3	7	....	1	....	3	4	11	24	630	536
North Louisiana	....	....	....	2	2	....	....	....	2	2	4	13	220	249
South Louisiana	4	....	....	1	5	....	1	....	1	2	7	11	410	287
Michigan	7	3	....	5	15	....	....	....	8	8	23	14	571	494
Mississippi	6	....	....	1	7	....	....	....	2	2	9	....	164	81
Missouri	....	....	....	....	....	....	....	....	....	....	....	....	36	22
Montana	4	....	....	1	5	....	....	....	2	2	7	1	282	178
Nebraska	....	....	....	....	....	....	....	....	1	1	1	1	11	36
New Mexico	10	....	....	1	11	....	....	....	1	1	12	7	338	227
New York	15	....	10	....	25	....	....	....	....	....	25	25	1,036	1,038
Ohio	4	3	....	3	10	....	....	....	....	....	10	18	740	681
Oklahoma	22	....	....	....	22	....	....	....	3	3	25	38	1,532	1,195
Pennsylvania	27	6	15	1	49	....	....	....	....	....	49	50	2,420	2,101
Tennessee	....	....	....	....	....	....	....	....	....	....	....	....	9	6
Texas	85	4	....	23	112	3	5	....	24	29	144	108	5,049	3,501
E.Tex.Bor. Co.'s	1	....	....	....	1	....	....	....	....	....	1	1	28	16
E. Texas Field	....	....	....	....	....	....	....	....	....	....	....	....	3	5
Rest of E. Texas	2	1	....	1	4	....	....	....	1	1	5	3	237	196
North Texas	16	....	....	6	22	....	2	....	7	9	31	27	1,166	871
W. Central Tex.	4	....	....	2	6	....	....	....	6	6	12	....	341	317
West Texas	26	....	....	3	29	3	1	....	3	4	36	33	1,329	774
Tex. Panhandle	7	2	....	1	10	....	....	....	....	....	10	10	209	163
G. Coast, Upper	11	....	....	2	13	....	....	....	....	....	13	14	492	267
G. Coast, Lower	12	....	....	1	13	....	1	....	4	5	18	15	779	530
Southwest Texas	4	1	....	6	11	....	1	....	2	3	14	4	376	310
S. Central Tex.	2	....	....	1	3	....	....	....	1	1	4	1	89	52
Utah	....	....	....	....	....	....	....	....	....	....	....	....	1	....
West Virginia	....	12	....	2	14	....	....	....	....	....	14	22	781	569
Wyoming	5	1	....	....	6	....	....	....	....	....	6	1	144	103
Total U. S.	250	29	25	64	368	3	7	....	63	70	441	479	19,670	15,719

* Includes distillate wells. † Includes salt water disposal wells.

Illinois. Oliver 1, CSW SW 29-22n-11e, near Malden in New Madrid County, Missouri, was located on a survey by the Missouri Geological Survey in conjunction with the Bureau of Mines.

Platte County: About 50,000 feet of gas was logged at 364-67 feet in black shale in Francis Fee 1, Section 35-51n-34w, in the Parkville community limits. Pipe was originally set at 262 feet, then pulled and the hole reamed and reset at 282 feet with the well at 370 feet, total depth. Rupert Fee 1, SE NE NW 22-51n-34w, tested 90,000 feet of gas in the Knobtown sand at 255-62 feet.

Kansas

Wildcat Near Coats Opens New Pool in Pratt County

Skelly Oil Company's Shriver 1, NEc 33-29s-14w, opened a new pool in Pratt County, 4 miles southwest of Coats in an area where nearest production is the Sun City pool in northwest Barber County. The well is rated at 344 barrels daily from Simpson sand, topped at 4563 feet.

Barber County: Black oil in the Sun City gas district is reported in Champlin Refining Company's Oldfather 1, SE NW NE 18-31s-14w. On drill-stem test in the Maquoketa at 4407-45 feet the hole filled with 3400 feet of oil and 350 feet of salt water. The test is ½ mile west of a gas well.

Stafford County: Phillips Petroleum Company's Vivian 1, NE NE SE 12-23s-12w, is a pool opener about 1½ miles south of the Richardson field. With Arbuckle topped at 3679 feet and 5-inch casing set at 3680 feet, the well was cleaned out to 3684 feet, total depth, filled up 720 feet of oil in 2 hours and swabbed 5 barrels of oil in 5 hours.

Brown County: Five miles southwest of the Falls City, Nebraska, pool, Clifton Gall's Livengood 1, NE NW SW 3-1s-15e, set pipe and was preparing to test the Hunton which showed porosity and saturation in a core from 2578 to 2590 feet. Since the county has no commercial production this test is being closely watched. It is about 6 miles east of a dry hole drilled earlier this year by Ohio Oil Company in Nemaha County, which had some oil shows in the Hunton.

Rice County: Nelson Drilling Company's Allison 1, NE NE NE 23-19s-6w, is a possible pool opener about a mile north of the Smyers pool. Mississippi chat was topped at 3341 and cored to 3346 feet, where good oil show was logged. Five-inch pipe has been set at 3342 feet for production test. The test is running much higher than a south offset which was dry.

Hodgeman County: The Texas Company continues testing Goebel 1, NEc SE 16-21s-24w, 15 miles southeast of the Arbuckle pool. Drilled to 6035 feet in Arbuckle, it was plugged back to 4515 feet and is testing oil shows in the Mississippi lime topped at 4215 feet.

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WARREN J. MILLER, 71, retired drilling contractor, died in a Tulsa hospital October 20. A native of West Virginia, he came to Oklahoma in 1907 and had resided in Tulsa since 1919.

N. G. BLANKENSHIP, former store manager for Jarecki Supply Company, Benton, Illinois, is now representing Bethlehem Steel Corporation at Oklahoma City.

New Mexico

Development to Be Pushed Near Eastern Lea Strike

Gulf Oil Corporation's Vivian Drinkard 1, C NE NW 30-22s-38e, Eastern Lea County discovery and first Clear Fork strike for New Mexico, flowed 782 barrels of 37-gravity oil on a 14-hour test after using 3000 gallons of acid through perforations at 6370-6460 feet. Previously the well flowed 265 barrels oil in 13 hours, with gas volume at 1,300,000 feet daily. Gulf Oil Corporation will drill a north offset, and made location for State 1, C NW NE 32-22s-38e, indicating development will be pushed.

Humble Oil & Refining Company's Leonard-Federal 1, prospective Ellenburger strike and the first for the state, was making production test of perforations at 11,890-11,928 feet, having plugged back from sulphur water at 11,969 feet. Top of Ellenburger and pay was called at 11,816 feet with elevation of 3012 feet. It is the state's deepest test, and is due to be the deepest producer in the Permian Basin.

The Texas Company continues to enlarge its wildcat operations in Lea and Eddy Counties, with the next project listed as J. S. Eaves 1, C SE NE 26-16s-38e, East Central Lea County.

West Texas

New Clear Fork Area for Gaines County Established

Humble Oil & Refining Company's Doss 1, C SW SW PSL Section 9, Block A-24, established a new Clear Ford area for Gaines County in flowing 10 barrels hourly, including 7 percent acid residue, from perforations at 7030-7140 feet. It is 3½ miles northwest of the Robertson 5900-foot Glorietta pool, and was drilled to 9049 feet. Doss 1 has been in process of completion for some weeks, and excluded the sulphur water content of the fluid when perforations from 7140 to 7233 feet were sealed off.

Amerada Petroleum Corporation's Jones 1, Gaines County wildcat 3¼ miles southwest of the Wasson deep production, tested dry from perforations at 7500-25 feet, having plugged back from 7838 feet, and will perforate by stages from 7095 to 7325 feet in Clear Fork.

Crane County: Gulf Oil Corporation's McKnight 6-E, 2½ miles northwest of the McKnight sector of the Sand Hills area and about 700 feet structurally, logged 40 feet of promising oil-saturated sand in coring the Waddell, or Basal Simpson, to 7100 feet. Drill stem test at 7072-7100 feet returned good gas blow to surface in ½ hour and 900 feet of oil-cut mud and 3700 feet of salt water. The oil was estimated at 29 gravity. The wildcat will be deepened to Ellenberger before running pipe. Sinclair Prairie Oil Company's McKnight 1-6, 4¾ miles northeast and on a separate structure, was drilling cherty-lime at 7960 feet on Ellenberger objective.

The Texas Company's Hobbs 2-B, ¼ mile northwest of the Crossett 3-well Devonian pool, was cleaning out after a 280-quart nitro shot at 5331-57 feet, having bridged back from 5386 feet. The company's Hobbs 3-B, 1⅛ miles northwest of production and checking high, failed to encounter porosity in drilling to 5333 feet, and will be carried to the Simpson.

Crockett County: Continental Oil Company et al's Todd 11, C SW SW Section 28, is the third well in the Todd field to encounter oil production in the Ellenberger, having flowed 185 barrels of oil on 2-hour test after using 1000 gallons of acid through perforations at 6290-6328 feet in Ellenberger, topped at 6087 feet with elevation of 2597 feet. It will be plugged back for completion in the Crinoidal. Amerada Petroleum Corporation's Todd 4-A and 5-A previously indicated production from the deeper zone. Dual completions are not deemed advisable due to the paraffin content of the Crinoidal. Amerada Todd 6-A, C NW NE Section 25, entered the Crinoidal at 5754 feet with effective pay at 5822-62 feet, then topped Simpson and Ellenberger at 5905 feet and 6054 feet, respectively. Broken porosity was logged in the Ellenberger at 6314-52 feet. Electrical formation survey was to be run at 6362 feet to determine if the latter zone carries water, but the well will be completed in the Crinoidal. It is now evident that Ellenberger production is obtainable on the flanks of the steep structure.

Andrews County: The Texas Company's University-Magnolia 1-L, 1⅛ miles east of the Emma field, flowed 541 barrels of oil with gas-oil ratio of 595/1 for completion through 2-inch after using 2000 gallons of acid through Holt perforations at 5310-30 feet.

Sun Oil Company's Martin 1, 2 miles north by west of the West Andrews field, swabbed 2 barrels oil hourly after using 4000 gallons of acid in San Andres saturation at 4381 feet. Sulphur water was reached in coring to 4401 feet, and the test will continue to its original Ellenberger objective. Champlin Refining Company's University 1-B, 3½ miles west by north of the West Andrews field, failed to make a producer after a series of perforations in Lower Permian and Devonian between 6634 and 8479 feet, and will attempt to complete in San Andres.

Fullerton Field: Magnolia Petroleum Company's Lowe-Bitler 2-B, C NW NW PSL Section 2, Block A-32, ⅝-mile northwest of the field's most northeasterly production, flowed 127 barrels oil natural on 6-hour test of Clear Fork at 7110 feet, then gauged 213 barrels oil in 6 hours after initial treatment with 2000 gallons of acid.

Kimble County: Phillips Petroleum Company's Spiller 1, wildcat that precipitated a major leasing campaign last spring and early summer on the strength of shallow oil and gas flow from the Ellenberger, was drilling brown lime at 3510 feet in the Hickory series, topped at 3384 feet. This well converted into a small gasser after acidizing the Ellenberger, and in deepening failed to boost its production in drilling through the 1009-foot section of Ellenberger.

Dawson County: Richmond Drilling Company's Nelson 1, 2½ miles north by west of Welch pool, reached sulphur water in deepening with tools to 5003 feet, and will be plugged back for nitro shot and acid in San Andres which showed for pumper.

Wildcats: Magnolia Petroleum Com-

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pany's Hart-State 1, 2 miles southwest of the Abell field, Pecos County, tested salt water at 5572-5609 feet in McKee sand, topped at 5558 feet, or 223 feet low, and was drilling sand at 5730 feet. The same company's Johnson 1, Lubbock County, recovered 320 feet of gas-cut rotary mud when tester was used in broken porosity at 6250-6311 feet, and was coring 6410 feet.

North Texas

Offsets for Odell Pool in Wilbarger County Slated

Development of the Odell pool, in Wilbarger County and most northwesterly production in North Texas, may attain sizeable proportions as east and west offsets were authorized by Fain & McGaha and Humble Oil & Refining Company, respectively, while Amerada Petroleum Corporation is due to drill its offset shortly. Fain & McGaha's Martin 1 opened the pool in mid-October with a natural potential of 252 barrels of 39.8-gravity oil through 20/64-inch choke from Canyon perforations at 4747-4806 feet. The area involves a large structure, according to geophysical information. Bell Pipe Line Company will extend 3 miles from the Fargo field when production warrants.

Jack County: Hanlon & Buchanan, Inc.'s Matlock 1, southeast of the East Bryson field's Strawn production, flowed an average of 13 barrels hourly for 36 hours through a 30/64-inch choke after using 1000 gallons of acid in Mississippian saturation at 5311-44 feet. The company will act promptly in drilling its acreage, although Mississippian strikes are generally small in area. Continental Oil Company's Risch 1, which showed for a gasser with a small volume of oil from Marble Falls perforations at 4947-68 feet to open a new pool in the southeast part of the county, failed to produce on preliminary test of Bend perforations at 4380-4420 feet.

Cooke County: The Texas Company's Rasure 1, Sivels Bend prospect that has been hindered in making successful completion in Strawn oil sand at 6760-77 feet due to casing leaks, filled at the rate of 8 barrels of fluid hourly, averaging 30 percent oil, between swabbing tests. A nearby test will be drilled regardless of the outcome. Two of the company's Cooke County wildcats were eliminated. Ben Bengfort 1 quit in lime at 2759 feet, while McGeorge 1, Hiram Walker Survey, entered dry Ellenberger at 3600 feet, and was barren to 3688 feet.

Clay County: Continental Oil Company's Welch 1, Block 26, Freestone County School Lands and 5¾ miles southeast of its recent discovery in Simpson near Buffalo Springs, drilled barren Ellenberger at 6765-6810 feet, then set pipe at 6750 feet to perforate opposite promising saturation in Simpson at 6614-28 feet. Fain & McGaha's Ross 1, a mile southwest of the Ross 2-pay field, logged favorable oil saturation in the Basal Bend at 5648-64 feet, then set 5½-inch casing at 5642 feet to try for completion.

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MAJOR M. T. HALBOUTY, chief of the Petroleum Production Section, Planning Division, Army-Navy Petroleum Board, Washington, D. C., has been promoted to lieutenant colonel.

East Texas

Deep Gas-Distillate Area Opened in Rusk County

H. C. Owens et al's Rousseau 1, Robert Gilkerson survey and midway between Minden and Pine Hill, Rusk County, produced from the deeper of two prospective zones in testing 3,000,000 feet of gas daily with distillate flow estimated at 20 barrels per million feet from perforations at 7382-89 feet in Travis Peak, topped at 7338 feet. Electrical formation survey indicated more effective porosity and saturation at 7095-7125 feet in Pettit, topped at 6988 feet with elevation of 595 feet, and this zone will be perforated and tested. Deep production in Rusk County has heretofore been confined to the Henderson field.

Robertson County: Hamman Oil & Refining Company's Gibson 1, Jesse Webb survey, 5½ miles west by south of Calvert, is showing for the county's first commercial well in flowing and pumping 27 barrels of 35-gravity oil on 15-hour test from sand at 2181-94 feet in Navarro, topped at 1542 feet with elevation of 292 feet. This wildcat was temporarily abandoned in June after plugging back from Edwards limestone at 4827-5017 feet and making an unsuccessful completion try at a higher level in the Navarro. The company's Gibson 2, situated 950 feet northeast, was drilling below 1000 feet. This development is southwest and along the same fault trend recently explored by Magnolia Petroleum Company and later by Al G. Hill et al with a series of tests, including a Smackover lime failure.

Wildcats: Humble Oil & Refining Company's Bruce 1, Van Zandt County, logged nominal oil shows in coring to 8685 feet, where drill-stem test, with tool set at 8615 feet, returned 210 feet of rotary fluid with light show of oil. The test was coring dry sandy-shale at 8695 feet. The company's Searcy 1, Mount Pleasant prospect, Titus County, was drilling sand at 9350 feet in Cotton Valley with the Smackover as its next objective. Humble Oil & Refining Company's Nichols 1, Pickton area, Hopkins County, was drilling hard sandy-shale at 8860 feet. Sun Oil Company's Turner 1, near Pickton, was changing to a heavier rig at 4807 feet in Woodbine, topped at 4595 feet.

Panola County: Skelly Oil Company opened a new gas-distillate production with official completion of Houston Wills 1, M. A. Romero Survey, 10 miles west of Carthage field, and possibly an extension to that rapidly expanding area. The well is rated good for 21.5 million feet of gas daily on open flow, with 22 barrels of distillate per million cubic feet through perforations at 6165-85 feet in the Upper Pettit. Total depth is 7006 feet, and flow string of 5½-inch casing was set at 6853 feet. Perforations in the Lower Pettit failed to indicate production.

Arkansas-Louisiana Gas Company's L. Hudson 1, Isabella Hanks Survey 271, is another producer in the Carthage field, gauged at 110,000,000 cubic feet of gas daily on open flow with 23 barrels of distillate per million feet. Production is from 224 perforations at 5970-6026 feet and 72 perforations at 6046-62 feet, following treatment with 5000 gallons of acid. Depth is 6608 feet.

The same operators' Cummings 1, N. Ivey Survey, 8 miles northeast of Carthage, went to 6384 feet and perforated with 36 shots from 4994-5004 feet. Packer was set at 5708 feet, the well acidized with 4000 gallons and production of 35,000,000 feet of gas obtained, accompanied by 16 barrels of distillate per million. Perforations at 5750-86 feet tested 18,000,000 cubic feet of gas on open flow, making 18 barrels of distillate per million with rock pressure 2583 pounds.

The Carthage area is the most active in the district. Fourteen rigs are running and several locations awaiting rigs, though more are becoming available. New tests now starting include: Arkansas-Louisiana Gas Company's Langford Unit 1, on 60-acre tract in William Rich Survey, drilling at 1800 feet; Glassell & Glassell's Carthage Unit 7, Mary S. Potts Survey, drilling below 2760 feet; Ann Lacy Lillard's W. G. Boren 1, 320-acre tract in SP RR Survey A-837, now 1150 feet in shale; the same operator's Parker Heirs 1, 642-acre tract in the William McFadden Survey, 2840 feet in shale and lime; Skelly Oil Company's J. J. Sealy Unit 1, Joseph Spencer Survey, drilling at 2665 feet in shale and lime; and Skelly's M. J. Whitfield 1, Thomas Scott Survey A-594, awaiting rotary. These tests will likely seek Travis Peak production.

Shelby County: Southport Petroleum Company is moving in materials at R. C. Poore 1, on a 65-acre tract in block 10, Holmes Byfield Survey, 2½ miles southwest of Beckville, test scheduled to the Travis Peak. It is considered on the same structure as the Carthage field to the northeast in Panola County.

Decision Reached in Shaffer Patent Infringement Suit

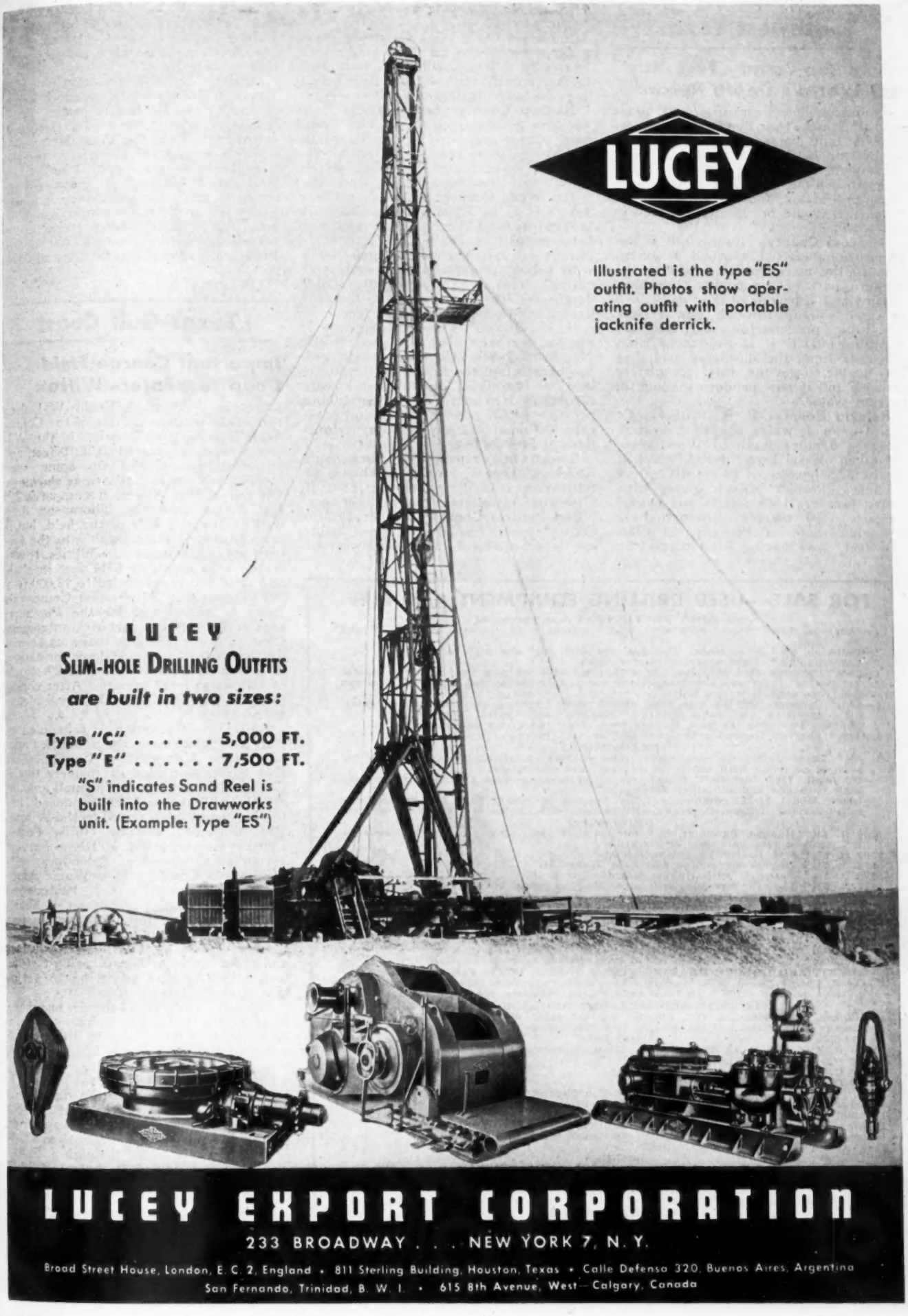
A decision in a patent infringement suit brought by William D. Shaffer of the Shaffer Tool Works, Brea, California, against Rector Well Equipment Company, Inc., Fort Worth, was returned recently by Judge James C. Wilson of the U. S. District Court, Fort Worth.

The decision was based on the law of laches or delay in bringing suit. Although the validity of the patents and their non-infringement were contested at the trial, Judge Wilson held that Shaffer was guilty of negligence in defending his patents because he had waited until 1943 to file suit for infringement, though he had notified the defendants in 1934 that they were infringing his patent.

The court deemed it unnecessary to decide whether or not the patents were valid or infringed.

School Tracts Leased

Two 80-acre tracts in Section 36-12n-4w in Oklahoma County, west of the Oklahoma City and south of the West Edmond pools, were leased by the State School Land Commission to Stanolind Oil & Gas Company which paid a bonus of $4088 for each tract. The acreage is not far from Bethany and is believed to be at the south end of the West Edmond pool. Stanolind holds a school tract to the south and is drilling State 1-51, a wildcat in the C NE SW 36-11n-4w, reported below 5645 feet.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Southwest Texas

McMullen County Test May Set World's Depth Record

Quintana Petroleum Company plans to drill South Texas Syndicate C-12, less than a mile northeast of the nearest production in the Greens Branch field, McMullen County, to possibly 16,000 feet. It will be in search of Edwards Lime production, and if such a depth is reached it would be the deepest well in the world.

Atascosa County: Humble Oil & Refining Company's Lockwood 1, extension to the new Charlotte field in the western part of the county, has been gauged at 108 barrels of fluid daily, 75.6 of which is net oil, through ¼-inch choke with tubing pressure 130 pounds and gas-oil ratio 1400/1. It is producing from Edwards lime, the discovery pay, but was unable to get the water completely shut off and is now producing about 30 percent water.

Refugio County: P. R. Rutherford's Smith-Crow 1, which opened a field in the area 8 miles south of Woodsboro, has taken official gauge during which it flowed 82.5 barrels of 24-gravity oil in 24 hours through ⅛-inch choke with tubing pressure 1475 pounds and casing pressure 1590 pounds. Production is through 24 holes in the casing at 4500-4504 feet, sand having been topped at 4485 feet, but carrying heavy gas in the upper part.

Stanolind Oil & Gas Company plans a deep test in the La Rosa field, in its Spaulding 9 which will be a twin well to the recently junked Spaulding 2, and is to be taken to 9000 feet.

Bastrop County: Seaboard Oil Corporation & Shamrock Oil & Gas Company plan a deep wildcat 6 miles south of Bastrop, to be carried as Bertha Artmann 1, scheduled to 8500 feet, which should take it well ino the Trinity series.

Jim Wells County: The Texas Company's H. C. de Tijerina 6, Tejerina field, brought in from the 7100-foot sand, has been gauged at 315.9 barrels of 40.3-gravity oil daily through ⅛-inch choke with tubing pressure 1950 pounds and casing pressure 1550 pounds. Total depth was 7167 feet with top of the producing sand picked up at 7083 feet.

H. H. Howell's Lorena J. Spoonts 1, one location west of the first well in the North Magnolia City extension area, has been completed from 5460 feet, making 260 barrels of 31-gravity oil daily through a 3/16-inch choke under tubing pressure of 625 pounds and casing pressure 990 pounds. Flow is from perforations at 5409-20 feet.

Blanco Oil Company & Al Buchanan's Eureka College 1, 5 miles northwest of Falfurrias, is drilling below 5725 feet after running electric log to 5538 feet.

San Patricio County: Sinclair Prairie Oil Company's Daniel P. Moore 1, wildcat, is scheduled 5 miles southwest of Gregory in the northeast corner of Section 79, Pauls Subdivision of Coleman Fulton Pasture Lands. Contract depth is 7000 feet with the well likely to be carried to 10,000.

Drilling & Exploration Company's Lovett 1, wildcat 8 miles north of Leroy, is drilling at 4376 feet in shale.

Tide Water Associated's Gerdes 1, discovery well in the West Sinton field which has been closed in since completion for lack of storage, is testing for final gauge, but has not completed the series of tests. On one gauge it flowed 19 barrels in 24 hours through a 5/64-inch choke with tubing pressure 990 pounds and casing pressure 1300 pounds. Production is from perforations at 3394-96.

Texas Gulf Coast

Important Conroe Field Deep Test Enters Wilcox

George W. Strake's Krohn W-1, deep test in the western portion of the Conroe field, is drilling and coring in the Wilcox formation, entered at 8010 feet, and while it has picked up some sand streaks, has not had oil or gas showings. On top of the Wilcox it compares 280 feet higher than the Thompson deep well on the east side of the field, but is not considered far enough into the formation to estimate its possibilities. It was coring at a depth of 8511 feet in shale and sand and is scheduled to 12,000 feet.

Pan American Production Company's Josey 1, second test for the Pinehurst area in the southern part of Montgomery County, is preparing to make its second drill-stem test in the Wilcox formation. A test at 8812-20 feet showed 29 stands of salt water in 23 minutes. After coring to 8960 feet, a test is being made at 8947-60 feet.

Gulf Oil Corporation is scheduled to start a Wilcox test in the Splendora area of eastern Montgomery County. This area has been drilled extensively to the Cockfield formation, and a small amount of oil and gas has been produced, but this has never been tested to the Wilcox. The new well will be Gulf's Foster Lumber Company C-1, P. Bryan Survey, 3½ miles southeast of Splendora.

Colorado County: Tide Water Associated Oil Company's D. L. Underwood 1, wildcat 3½ miles northwest of Sheridan, is preparing for a production test which may open a field for Colorado County. The wildcat drilled to 9990 feet and ran a string of 7-inch casing to 9962 feet, which is now preparing to perforate after drilling plugs.

Sinclair Prairie Oil Company has made location for Felix Fehrenkamp 1 as a 10,000-foot Wilcox test in the area 5 miles northeast of Rock Island in Section 23, SA&MG Survey.

Cities Service Oil Company's Poole 1, Ramsey area, has moved the rig to drill another well in this area, but is still testing through various chokes after completing through perforations at 8850-77 feet. On one gauge through a 28/64-inch choke, it flowed at the rate of 207 barrels of 57-gravity condensate daily with 7,076,000 feet of gas with tubing pressure 1900 pounds and gas-oil ratio 34,000/1. A test through 11/64-inch choke showed 58.8 barrels of condensate and 1,790,000 feet of gas daily.

Hardin County: American Republics Corporation & Houston Oil Company's

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Fee 10, in the Silsbee field, originally producing from the 6900-foot Cockfield sand, will be deepened to 8500 feet for a test of the Wilcox sand which produces in the Joes Lake field in Tyler County.

In the area south of the town of Warren, Houston Oil Company & American Republics Corporation's Hardin County School Land Fee 1, drilled to 7006 feet, failing to find further showings in the Cockfield-Yeuga section, and has stopped to run a string of 5½-inch casing to 5880 feet for a test of the sand at 5800 feet, where operators recovered condensate on a drill-stem test. The test had been made at 5796-5808 feet at the time the sand was cored.

Sun Oil Company's Merchant Estate 1, deep test in the Sour Lake area, is drilling below 8135 feet in hard sand and shale.

Wharton County: General Crude Oil Company's Security Bank & Trust Company 2, south of Lane City and north of the Magnet-Withers field producing area, is setting casing to 5550 feet for a test of sand in the upper Frio. The well was drilled to 5727 feet before decision was reached to set pipe. It reported good showings in the supper sand.

Salt Dome Oil Corporation has made location for H. P. Stockton 1, a 6000-foot wildcat test 5 miles northwest of Louise and northwest of the company's Vitera 1 which has set casing at 5591 feet.

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R. P. LEHMAN, Shawnee, Oklahoma, geologist, with Phillips Petroleum Company, gave a paper, "Erratic Masses in the Sulphur Area," before Shawnee Geological Society at the October meeting.

South Louisiana

Two 10,000-Foot Producers In St. Landry Completed

Sun Oil Company has completed two producers in St. Landry Parish, both in comparatively new fields and below 10,000 feet. The company's Domingeaux 1, in the Cankton field area, completed from perforations in the field sand around 9700 feet, making 237 barrels daily through a ⅛-inch choke with tubing pressure 1675 pounds and casing pressure 1100 pounds.

Sun Oil Company's Burleigh-Miller Pool 1, in the Shuteston area, completed from 10,364 feet, making 157 barrels of 40.5-gravity oil daily through a ⅛-inch choke with tubing pressure 1900 pounds.

Gulf Refining Company has made location for its Opelousas-St. Landry 1, SW 13-6s-7e, Krotz Springs area, scheduled to 11,000 feet.

Calcasieu Parish: On official Conservation Department potential test, Continental Oil Company's Prairie Land & Canal Company 2, recent extension to the East Moss Lake field, made 236 barrels of 48.6-gravity condensate daily through a 12/64-inch choke with tubing pressure 5600 pounds. No water was in evidence. It was completed through perforations at 10,414-418 feet in the discovery sand. Union Oil Company of California recently made location for a well in this field.

Continental Oil Company's Glen Greathouse et al 1, South Lake Charles prospect wildcat, was delayed in making final tests by additional squeeze jobs and is now awaiting cement. The well failed to show satisfactorily on tests with casing perforated at 10,904-914 and 10,894-904 feet.

Acadia Parish: Sun Oil Company's Estherwood Townsite 1, Estherwood area, has drilled out of the 2142 feet of 13⅜-inch surface casing and is drilling below 5078 feet in shale.

Union Sulphur Company's Andrus A-1, Branch area, is drilling below 6425 feet in shale. On final test, Union Sulphur Company's Gueno 3, which opened the new 11,000-foot sand, flowed 177 barrels of 45.5-gravity oil daily through a 10/64-inch choke from casing perforations at 11,085-090 feet. Pressures were still high, a tubing pressure of 6325 pounds per square inch having been shown at the time of the potential test.

Iberia Parish: Humble Oil & Refining Company's Petit Anse Company B-2, Avery Island dome, is conditioning mud at 10,537 feet in salt. This well has already set casing at 9575 feet, but plans to drill through the salt, found just above the casing seat.

In the New Iberia area, The Pure Oil Company's L. L. Trahan 1, is drilling below 11,384 feet in hard shale.

Iberville Parish: Humble Oil & Refining Company's C. G. Robinson 1, more than a mile southeast of the discovery well in the Laurel Ridge field, is preparing for production test after having made squeeze jobs at 10,651-653 and 10,658-660 feet.

Record Low Accident Mark Set by Oil Firm Vehicles

Accident frequency in the operation and maintenance of automotive equipment by oil companies during 1943 has been record-breaking, according to the 12th annual summary of motor-vehicle accidents published by the Department of Accident Prevention of the American Petroleum Institute. Accident frequency is the lowest since the Institute began reporting the figures in 1932. This reflects an excellent driving and maintenance record despite acute wartime shortages of manpower and materials.

In response to the Institute's annual request for information concerning traffic accidents, 151 companies—operating 48,996 motor vehicles — reported their experience to the Department of Accident Prevention for 1943.

Information for 117 oil companies, operating 45,032 vehicles during 1943, discloses that these vehicles traveled a total of 612,927,541 miles during the year; and that they had 1.14 accidents in each 100,000 miles of travel.

During 1943 the 18,817 passenger cars reported separately in the report traveled 151,920 miles to each accident; the 25,985 trucks reported separately, averaged 68,032 miles of travel to each accident. Accidents per 100 vehicles decreased from 17.3 in 1942 to 15.5 in 1943.

In summarizing the petroleum industry's annual accident experience, the Institute uses the following definition of a motor-vehicle accident: "A reportable motor-vehicle accident is an accident in which a motor vehicle in company service is involved, unless properly parked, resulting in a death, personal injury, or property damage regardless of who was hurt, what property was damaged, or who was responsible." This is the same definition used by the National Safety Council in gathering motor-vehicle accident data from fleet and industrial operators.

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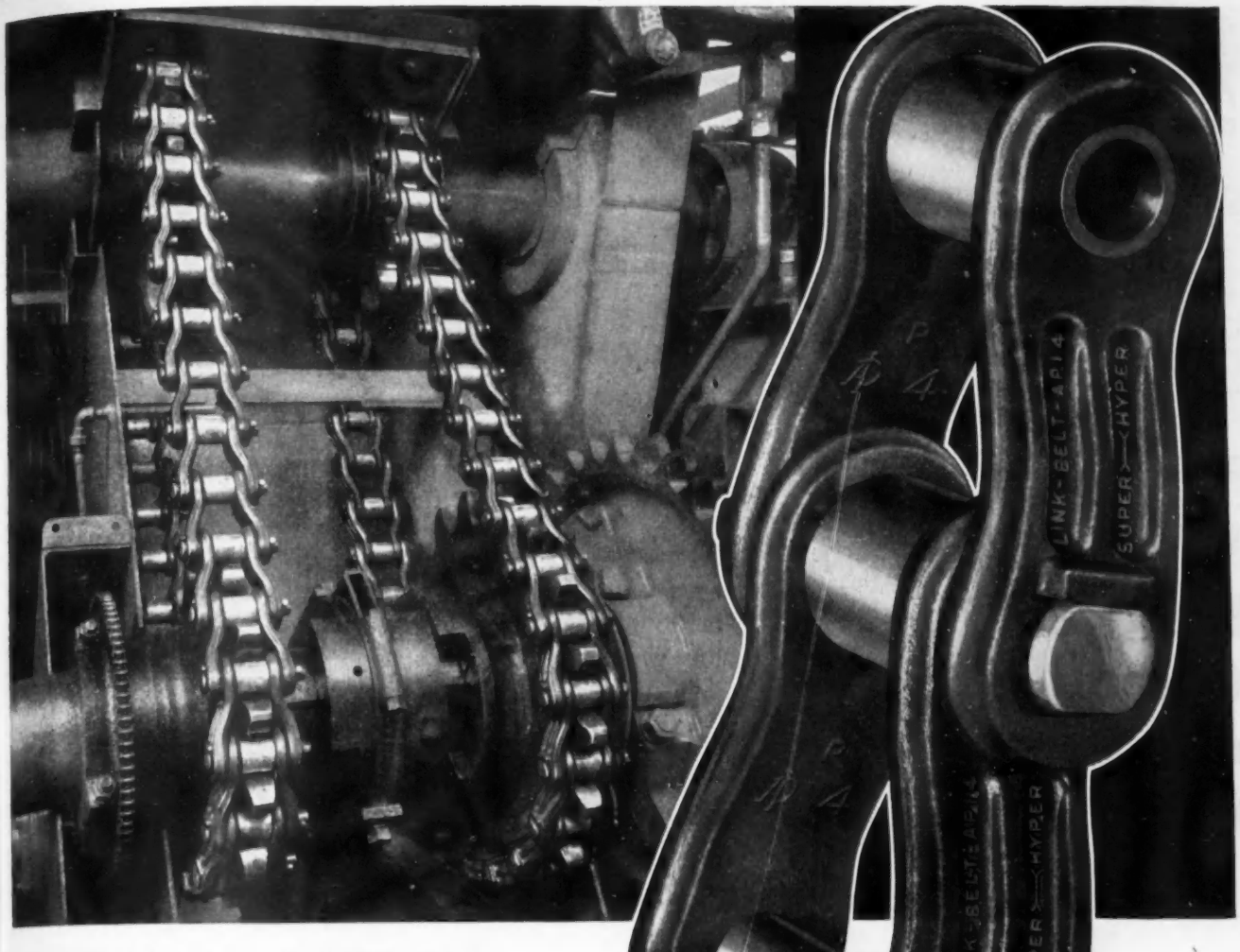

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North Louisiana

Tests Continue on Bossier Gas-Distillate Discovery

Barnsdall Oil Company and Sohio Petroleum Company continue testing J. T. Hanks 1, NW SE 7-20n-12w, new gas-distillate discovery in Bossier Parish, 6 miles northeast of Benton. A 24-hour test gauged 241 barrels of 61.6-gravity distillate and 21 barrels of wash water, with 4,600,000 feet of gas from 243 perforations of the Bodcaw sand at 8001-40 feet, using ¼-inch chokes top and bottom. After setting tubing with packer another test recorded 7.7 barrels of distillate per hour during a 9-hour period. Flowing tubing pressure was 2750 pounds but no estimate was given of gas volume. Both tests produced from the Cotton Valley "D" sand, but the well also showed for gas-distillate production after perforating the Bodcaw sand of the Cotton Valley in its entirety from 8114-50 feet.

Caldwell Parish: Shell Oil Company's Louisiana Central Lumber Company 1, NW 31-15n-3e, which showed possibilities of opening a gas or gas-distillate area before it blew out in September, has resumed operations. Debris has been cleaned up and crews are awaiting arrival of more artificial mud. Considerable mud has been pumped in and is circulating. The well will be killed before a completion attempt.

Tensas Parish: Magnolia Petroleum Company ran a 10-minute drill-stem test in R. D. Shelley B-2, SE¼ 30-11n-10e, and recovered 55 feet of 52.7-gravity distillate from 8332-46 feet, using ¼-inch and bottom chokes. This test is in the Holly Ridge field and is the first to indicate this type of production. The discovery well produced 37.5-gravity oil from the Tuscaloosa. Shelley B-2 was drilled from 8346-52 feet and a core was cut from 8352-64 feet.

Lincoln Parish: The California Company is trying to remove liner, cemented from 9118-9727 feet, out of Jessie Mae Norris 1, C NW NE 15-18n-1w, before perforating to test upper horizons which carried showings of oil. Tests have failed to indicate production.

Natchitoches Parish: Signal Oil and Gas Company, subsidiary of The California Company, has staked its first well in North Louisiana at Morrison et al 1, NE 12-13n-8w, 4 miles southwest of Ashland, and will drill to 10,000 feet. The company has about 4250 acres in the area recently acquired from George Echols, who drilled a deep test in 13-13n-8w during 1942 that went to 9500 feet, logging shows of oil insufficient for commercial production. Leasing is active in the Robline area and extreme northern part of the parish.

Morehouse Parish: The Texas Company has announced location for R. R. Kennedy 1, C SW SE 32-22n-6e, 10 miles south of the Arkansas-Louisiana state line, which will be another attempt to discover production from the Smackover lime. Recently, the company drilled Louisville Cooperate Company 2, 36-23n-8e, hitting the Smackover at 4714 feet, and going to 4917 feet with no showing of oil.

Caldwell Parish: The Atlantic Refining Company is starting Tremont Lumber Company 1, 6-13n-2e, 1½ miles south of the operators' Louisiana Central Lumber Company 1, recently abandoned, although it hit a salt dome. Scheduled for 9500 feet, the new test will try for oil production on the flank of the dome.

West Carroll Parish: Arkansas Fuel Oil Company's Frances Briggs 1, 9-21n-11e, will be taken to 7000 feet if necessary, as operators believe the well is on a structure favorable to gas production.

Claiborne Parish: The Ohio Oil Company reperforated from 10,525-35 and 10,490-508 feet in the Cotton Valley horizon in G. W. Taylor Account 4 P-1, C SE¼ 15-23n-8w, deep test in the Haynesville field. Tubing was run and the well produced 295,000 cubic feet of gas and 1.6 barrels of mud and wash water through 16/64-inch choke on tubing. No distillate was showing. Further tests will be made.

Water Flooding Authorized On Oklahoma Pool Lease

Cities Service Oil Company has been authorized by the Oklahoma Corporation Commission to utilize water flooding on an Oklahoma City pool lease to increase production in the Johnson sand. This is the first water-flood for secondary oil recovery to be tried out in that pool.

The company plans to deepen its Jones 9, SW NE NW 31-11n-2w, from 6658 feet where it has been producing from a sand between the Wilcox and Jones horizons to the Jones sand, utilizing it as a water input well. Fourteen wells have been drilled on the company's lease but only two are producing from the Jones sand.

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Arkansas

New Smackover Lime Field Indicated in Union County

A new Smackover lime field may be brought into Arkansas' productive areas, it is indicated by tests being made of Root Petroleum Company's Union Saw Mill 1, C NW NW 27-18s-12w, Strong area of Union County. During a 14-minute drill-stem test from 6338-53 feet, the well recovered 900 feet of pipe line oil and 900 feet of drilling fluid with a salty taste. The well was drilled to 6309 feet, elevation 136 feet. First porosity is at 6320 feet with possibly 17 feet of lime saturated with oil. Casing has been run in preparation for perforating. The bottom section of the Smackover carried salt water but 17 feet showed saturation and no water.

McAlester Fuel Company plugged back to the upper section of Smackover lime to make further perforations in Wilson-McRae 1, C NW SE SW 28-16s-18w, ¾ mile from the discovery well in the Salem Church field, Union County. Salt water killed the flow of gas-distillate coming through 32 perforations opposite 7026-32 feet. The well previously flowed salt water steadily from open hole at 7065-67 feet. Earlier drill-stem test at 6947-7050 feet recovered 150 feet of distillate and a good blow of gas with no indication of formation water.

R. H. Crow cemented 10-inch casing at 250 feet in Randolph Smith 1, NE NE NE 26-18n-15w, a proposed Nacotoch sand test near the Crescent Drilling Company's Root 1, which Crow recently salvaged from a dry hole into a stripper producer. Smith 1 is awaiting cement.

Ashley County: Union Producing Company is drilling slowly in Crossett Lumber Company E-1, 12-19s-7w, deepest wildcat test drilling in Arkansas. The well was below 10,630 feet in white sand and shale with no shows of oil or gas reported.

Johnson County: Arkansas-Louisiana Gas Company is drilling at 6050 feet in hard sand, using cable tools in S. M. Hudson 1, C NE 15-10n-24w, deepest test so far made in the Clarksville field. This sand section is believed to be Ordovician, and the well will go to the Arbuckle lime. No shows have been reported.

Pope County: Stanolind Oil & Gas Company is drilling at 3965 feet in shale in G. B. Maxwell 1, C SE SE 18-2n-18w.

Plymouth Oil Company has a location for R. G. Williams 1, 24-13n-30w, another cable-tool wildcat which will go to 6000 feet.

Columbia County: No wildcats were staked during the week, after an active program announced the week before. Hunt Oil Company is reportedly planning a test north of the Village field. The company's leases are in Tws. 16s-19w and northern portion of Tws. 17s-19w.

Southwood Oil Company gauged 72 barrels of oil in 24 hours through 18/64-inch choke on tubing at L. H. Pearce 1, C NW NE 10-18s-20w, new producer in the Calhoun field. The well has been in a semi-completed state since June and required working over to squeeze off salt water encroachment coming through perforations in the Smackover lime. Plastics were tried for the first time in squeezing but did not successfully complete a shut off and cement was finally used. Production is coming from 8279-87 feet, with flowing tubing pressure of 900 pounds during final test and no formation water reported.

Spacing Rules Changed For Fields in Arkansas

A relaxation of the 40-acre spacing requirement of PAW has been granted to eight oil fields in Arkansas. All of these fields were granted 10-acre spacing, with a special provision for one field, the Stephens-Smart Field of Nevada, Columbia and Ouachita Counties, where it was stated that shallow wells now producing from the Blossom Sand at approximately 2150 feet could be disregarded in the spacing of wells to the Travis Peak formation. The list of pools follows:

Champagnolle, El Dorado East, El Dorado South, Nick Springs, and Wilmington, in Union County; Hampton, in Calhoun County; Smackover, in Ouachita and Union Counties; Stephens-Smart, in Columbia, Ouachita and Nevada Counties.

Irma and Troy fields of Nevada County have been changed from 40-acre spacing to 5 acres.

Arkansas Allowable Cut May Follow Pressure Drops

Pressure drops in three Arkansas oil fields may result in a reduction of allowable production, the Arkansas Oil and Gas Commission reported. The Atlanta, Dorcheat and Magnolia fields of Columbia County have shown appreciable drops in pressure recently.

The Midway field, Lafayette County, has shown a gain in reservoir pressure, due to fresh water injection into the producing formation as an aid to natural reservoir energy.

The average daily reservoir pressure change, in pounds per square inch, as reflected in the present survey of the commission compared to the previous survey of the commission's engineers, is listed below on 8 of the 47 fields in the state.

POOL	DAILY PRESSURE CHANGE	
	Previous Survey	Present Survey
Atlanta	—.06	— .75
Atlanta-West	—.96	— .32
Calhoun	New	— .33
Dorcheat	—.57	—1.00
Macedonia	—.80	— .74
Magnolia	—.04	— .27
Midway	+.01	+ .01
Schuler-Jones	—.00	— .15

Equipment to be Topic at ASME Meet November 17

Ezra W. Clark, vice president and general manager of Clark Tructractor, division of Clark Equipment Company, will be the principal speaker at the November 17 meeting of the Mid-Continent Section, ASME in Tulsa.

A film originally produced for educational purposes in the armed forces and recently released for civilian review will accompany his talk, entitled: "Materials Handling Equipment." Clark has been actively associated with the Bureau of Service and Supply and inspected United Kingdom embarkation ports before the European invasion.

Southeastern

Sand Section Showing Oil Checked by Lamar Test

Gulf Refining Company's C. V. Cooper 1, prospective discovery well in the Baxterville area, Lamar County, was drilling below 8888 feet after recording a solid sand section of 112 feet, showing oil and believed to be the Massive Tuscaloosa section, the original objective.

The sand came in from 8723-8835 feet, and several drill-stem tests recovered oil enough virtually to assure production. Latest test in the oil-bearing section was at 8825-35 feet, where it recovered 3000 feet of 16.5-gravity oil, following other tests in the same section, which also recovered oil. Latest test in the well was at 8836-68 feet, where it recovered salt water with a trace of oil. The only discouraging factor is that the oil is heavy.

Sun Oil Company has made location for F. M. Snowden 1, Section 7-1n-16w, east offset to Gulf's Cooper 1 and will commence operations at once. The company intends to drill to 9000 feet to the lower Tuscaloosa.

Shell Oil Company's Hibernia Bank & Trust Company, on the flank of the Tatum non-productive dome, is coring below 7380 feet, where it is probably in the Eutaw formation.

Sinclair-Wyoming Oil Company has spudded Newman Lumber Company 3 and is drilling below 1165 feet in shale. This well is in extreme northwest Lamar County.

Adams County: The Pure Oil Company's McDowell 2, deep test southwest of the Cranfield field, is drilling below 10,591 feet in hard shale and sand. It will go some deeper before coming back to try to complete in the sand at 10,300 feet.

Copiah County: Arkansas Fuel Oil Company is preparing to drill J. H. Caraway 1, on a highly-regarded geophysical structure in SW 15-1n-3w, in Copiah County. Drilling is being supported by a number of companies and operators, including Stanolind Oil and Gas Company, Gulf Oil Corporaiton, Sun Oil Company, Lion Oil Refining Company, Tide Water Associated Oil Company, and Walter Goldston. Rig is to be moved in immediately.

Jefferson Davis County: Gulf Refining Company's D. L. Mullins 1, wildcat 2½ miles southwest of the discovery well in the Gwinville area, was preparing to make a drill-stem test somewhere below 8050 feet after electric survey showed indications of gas or distillate around 8000-8034 feet. This showing is probably still in the Eutaw section which was topped at 7764 feet and is reported higher on structure than the Richardson discovery well to the northeast.

Warren County: Magnolia Petroleum Company's H. D. Ragsdale 1, wildcat 6 miles east of Vicksburg, is drilling below 8950 feet in sand and shale in the Lower Cretaceous formation after failure to show gas or oil in the Tuscaloosa. Sand had been found at 8790-8848 feet, but core analysis indicated salt water. Drill-stem tests attempted at this point failed mechanically.

Sinclair-Wyoming's Mary G. Blake 1, in northern part of the county, near Redwood, is to spud in immediately.

Claiborne County: Sun Oil Company's

W. R. Hammett A-1, Bruinsburg area, has cemented a string of 7-inch casing at 1937 feet to act as protection from the heavy gas pressure which has caused it to blow out and caused the first well on the prospect to be junked.

Sohio Petroleum Company's Georgiana Mackey 1, in 4-10n-3e, is drilling below 7938 feet, still with no showings.

Lincoln County: Sun Oil Company has made location for a test in the Mallalieu area recently discovered by The California Company. Sun's Leon Boyd 1 will be slightly more than ½ mile southwesterly from the discovery well.

The California Company's J. S. Nordan 1, offset to the discovery well at Mallalieu, is drilling below 9200 feet after having reported top of the Clayton at 8268 feet, checking about 3 feet lower than the discovery well.

Florida

Humble Oil & Refining Company, which recently abandoned Gulf Coast Realties 2, deepest test drilled in Florida, is preparing to spud Gulf Coast Realties 4, 20-48s-30e. The company is building roads and preparing to move in at Gulf Coast Realties 3, C SW SE 28-48s-30e, another scheduled deep wildcat test in Collier County. In Dade County, Humble completed repairs after a hurricane and is drilling below 7440 feet in gray lime.

Gulf County: The Pure Oil Company's C. C. Hopkins 1, C SW NE 21-6s-9e, deep test, is coring at 5690 feet, but has not divulged information on formations.

Highlands County: Humble's G. C. Carleton Estate 1, C SW NE 34-38s-29e, has derrick up and is awaiting rig.

Leon County: Stanolind Oil & Gas Company's St. Joe Paper Company A-1, NW C NE NE 15-2s-2e, is drilling below 2535 feet. The company is reported planning another well in Dixie County. Leasing continues actively throughout the state and geophysical work is increasing.

Georgia

The California Company's Brunswick-Peninsula 1, in Land Lot 7, Williams Survey, Wayne County, shut down at 980 feet for motor repairs, drilled to 1075 feet and again shut down. Water gave out and it was necessary to bring in a water-well outfit. The test is expected to reveal valuable information on the uplift in Eastern Georgia.

Sun Oil Company is reported preparing to stake a wildcat on a 7500-acre block in western Atkinson County. Hunt Oil Company is to drill a second deep wildcat in Decatur County. The company recently abandoned Superior Pine Products Company 1, Land Lot 363, Land Lot 13, after going to 3850 feet.

Alabama

Hunt Oil Company abandoned Harry B. Jones, Trustee 1, C SE SE 3-1n-113, Escambia County, Alabama, 7232 feet after electrical survey failed to indicate possibility of commercial production. In Washington County, Humble Oil & Refining Company abandoned J. R. Williams et al B-1, C SW NW 20-6n-4w, also without obtaining shows. The following tops were picked up by electric log: Wilcox 1395 feet, Midway 3218 feet, Selma 3845 feet, Eutaw 4950 feet. Depth of hole was 6547 feet.

Washington County: The Texas Company's N. S. Stallwaorth 1, C SW NW 10-3n-3w, is drilling below 6734 feet. A. C. Derr, Trustee's Hobson 1, C SW NE 9-8n-2w, is drilling below 305 feet.

California

World's Deepest Well Now At 15,455 Feet in Shale

Standard Oil Company's K.C.L. 20-13, world's deepest well, NW SW 5-31-25 is drilling at 15,455 feet in shale. Formation is somewhat softer and good progress is being made.

Pacific Lighting Corporation completed its first gas well in the Goleta gas field for 12,900,000 feet through 2-inch tubing and on a flow test through 8⅝-inch casing the flow was at a 145,400,000-foot rate. Several more wells will be drilled to take care of the winter demand in the Los Angeles area.

Kern County: Harry H. Magee, Operator-Amalgamated-Happold 2 in 15-25-24 cemented 7-inch casing at 10,390 feet and is gun-perfoating for Vedder showings.

General Petroleum Corporation's Larkins 1 in 10-28-28 was abandoned October 20 at 3029 feet. Top of gray Vedder was placed at 2765 feet. Drill pipe which stuck at 2875 feet was shot and recovered from 1000 feet. Another well will be drilled on the Larkin lease.

Reserve Oil and Gas Company's 33-7 in 33-11-19 has milled up the 5½-inch Securaloy liner to 2633 feet.

Fresno County: British-American Oil Producing Company plans a test well about 4 miles southwest of the Helm area in Section 6-17-17. The Texas Company drilled Loescher 1 about a mile southwest of this proposed location in 1939 and went to 9613 feet before being abandoned.

Kansas Geologist Speaks To Group in Pittsburgh

Major Raymond C. Moore, state geologist of Kansas, now on leave to the Army, addressed the first meeting of Tri-State geologists in Pittsburgh, Pennsylvania, October 27 on "Geology and Geomachy," a topic that signifies earth science and world war.

The address was devoted chiefly to wartime and postwar efforts to obtain supplies of oil products, with special consideration given geologic research. Pertinent observations on the character of sedimentary strata included reference to geological formations in the Tri-State area. A summary was given of certain concepts of Hans Stille on the nature of the Appalachian geosyncline and non-existence (except in the minds of many American geologists) of the continental borderland called Appalachia. Stille's work, published in Berlin after the beginning of the war, is as yet unknown to most Americans.

Change Made on Income Of Cancelled Contracts

A new ruling by the Treasury Department, dealing with the taxable status of earnings growing out of settlement of canceled government contracts, holds that such earnings are to be treated as income, for tax and renegotiation purposes, in the year of termination and not necessarily in the year received by the contractors.

This is a departure from established policy, under which claims for compensation under canceled contracts have not resulted in income until allowed or definitely determined, and may, in some instances, necessitate a revision of income returns and tax computations where settlement is made in a year following that in which a contract was terminated.

New regulations issued by the office of contract settlement to speed up settlement of terminated war contracts delegates to all war contractors the authority to make final settlement of net claims submitted to them for less than $1000, where the claimant keeps or disposes of all inventory.

Rocky Mountain Area

Big Sand Draw, Crooks Gap Wells Showing Saturation

Sinclair-Wyoming Oil Company's deep test in the Big Sand Draw gas field, Fremont County, Wyoming, Unit 1, SW NW NW 14-32n-95w, on drill-stem test in the Embar at 6890-6913 feet, open 57 minutes, showed 1500 feet of 32-gravity oil with an estimated 90,000 cubic feet of gas. A second drill-stem test at 6930-6955½ feet, open 17 minutes, recovered 15,000,000 cubic feet of gas and 20 gallons of 54-gravity distillate. The well is drilling in the Embar below 6970 feet.

Big Sand Draw produces gas from the Frontier. The lowest horizon tested prior to the drilling of Unit 1 was the Morrison.

Crooks Gap: Sinclair-Wyoming Oil Company's State 1, NW SW NW 18-28n-92w, Crooks Gap structure, Fremont County, is preparing to drillstem test the Muddy sand. Top of the Muddy was logged at 5055 feet and a core taken at 5063-5069 feet, 5-foot recovery, showed saturation.

Frannie: Continental Oil Company's Mau 2-F, SE NW SW 25-58n-98w, south of the south fault block in the Frannie field, Park County, Wyoming, found production in the Tensleep sand and is swabbing at the rate of 11 barrels per hour through perforations at 2919-2949 feet. The well logged the top of the Tensleep at 2918 feet and was drilled to 2952 feet. The fault runs in a northeast-southwest direction through Section 25 and the Tensleep producers to date have been located to the north of the fault. A well drilled last year by Continental in SE NE SW Section 25 encountered water in the Tensleep and was completed as a Madison producer.

Exposition of Power and Mechanical Engineering Set

The Sixteenth National Exposition of Power and Mechanical Engineering will be in Madison Square Garden, New York City, November 27 to December 2. In the show are included equipment, materials and supplies for maintaining and renewing processing and manufacturing plants, machine tools, process control systems, systems for the feeding and conveyance of ingredients, materials handling systems, aids to research, and plant development and planning.

Admission will be by invitation and registration only. Registrations will be accepted from all persons intersted in mechanical plants.

OPA to Continue 1942 Prices on Civilian Goods After German Defeat

Prices of civilian goods coming on the market after the defeat of Germany will be held by the Office of Price Administration as close to 1942 levels as possible, not only as a hedge against inflation but also as a means of providing full employment.

Asserting that present ceiling prices have permitted full production and record profits, Administrator Chester Bowles last week predicted that most consumer goods industries now in production will continue to prosper under those ceilings because volume will increase as wartime restrictions are removed and materials become more plentiful, and because overime payments probably will decrease and more efficient labor will become available.

For a dozen key industries which have been devoted almost entirely to war output—inclunding automobiles—pricing policy will be determined through conferences in Washington with each industry, and where an increase over the 1942 prices is required to bring a product back on the market it will be granted, since the objective is to encourage manufacturers to expand, not curtail, production.

Industrial leaders were not fully in accord with the price administrator's conclusions, but Bowles charged that before the war full production and empolyment were curbed in some industries because business men pursued a policy of high unit profits based on restricted production, rather than going after the larger total profits that might have come through larger volume at a lower profit per unit.

"If, during the next few years, major segments of American industry operate on a high price, high unit profit basis, we are going to have diminished production and dangerous unemployment," Bowles said. "If major segments of American industry attempt to cut prices by depressing wage rates, we will face the dangers of another disastrous depression."

Illinois Basin

McClosky Lime Is Tested Near Illinois Discovery

North of its pool opening well, Phillips Petroleum Company is testing McClosky lime at 3132-47 feet at the Bolander 1, SW SE NE 6-2n-10e, Richland County. Meanwhile the company's discovery, Richland 1, NE SE SE 6-2n-10e, West Madison township, has been placed on pump after making 600 barrels daily from McClosky.

In the same county, The Pure Oil Company's wildcat, Gray 1, SE SW SE 9-4n-10e, Denver township, is drilling below 2600 feet.

Franklin County: Approximately 7 miles northeast of Benton, Central Pipe Line Company is opening a pool at Rose 1, SE NE SE 4-5s-3e. The well tested 1230 feet of oil and 60 feet of oil-cut mud in one hour after making gas in 6 minutes from McClosky lime at 2973-79 feet. Nearest production is 2 miles.

Hamilton County: The Texas Company was nearing the expected Devonian pay strata at Davis 14, 7-6s-7e, Dale field. The wildcat venture was drilling below 4200 feet with Devonian, the goal of the well, expected at 4500 to 5000 feet.

In the Belle Prairie area, Kingwood Oil Company was getting operations under way at Meuhlenheim 1, NE NE SE 3-4s-6e, a wildcat test.

Clay County: The Texas Company's Rose 1, NW SE NE 10-5n-5e, north extension of the Iola pool, pumped 32 barrels of oil and 7 barrels of water in 24 hours from Cypress sand at 2380 feet.

Lawrence County: Cherry and Kidd's Gray Trustee 1, NE NE SW 19-3n-12w, has set casing at 2105 feet for production test of McClosky lime at 2044-48 feet and 2074-77 feet.

Fayette County: Deep Rock Oil Company has abandoned Albert 1, SE SE NW 33-5n-1e, wildcat test south of Shebonier, at 1850 feet.

Jasper County: The Pure Oil Company was drilling below 2800 feet at Kaufman 1, NE SE SE 27-6n-10e, wildcat near Boos.

Bond County: Lynch and Rea's Vohlkin 1, 31-4n-12w, wildcat in the Beaver Creek area, has been abandoned at 1137 feet. Rotary tools have been rigged for Union Products Company's Accomero 1, NE NW NE 26-4n-4w, wildcat.

Geological Survey Offers Petroleum Area Charts

The Geological Survey has announced the publication of several preliminary maps and charts of petroleum producing areas, copies of which are available at the office in Washington.

Included are: Preliminary map 11, geology and oil and gas possibilities of south-central Michigan, 25 cents (available also from the geological survey division of the state department of conservation, Lansing, Michigan).

Geologic map (preliminary map 12) and structure sections of the Batesville district, Independent county, Arkansas, 40 cents.

Preliminary map 13, geologic and structure contour map of the Maverick Springs area, Fremont, county, Wyoming, 40 cents.

Preliminary map 15, geologic map of the Daugherty asphalt area, Murray county, Oklahoma, 25 cents.

Civilian Jobs Related to Military Duties Are Listed

The division of occupational analysis and manning tables of the bureau of manpower utilization of the War Manpower Commission has published a 500-page booklet entitled "Special Aids for Placing Military Personnel in Civilian Jobs (Enlisted Army Personnel)."

The study which consists of a series of "job families," each of which lists civilian jobs related to a military occupational specialty, may be purchased from the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C., at $1 per copy.

Michigan

Fork Field Extension Of Fading Importance

Completion of the fifth Dundee lime failure in the west extension district of the Fork field, Mecosta County, has definitely reduced the prospect as an outstanding addition to the two-year-old pool. Latest failure was Rowmor and Wellers' Haynal 1, S½ SW NE, 2-16n-8w, ½ mile northwest of Sun Oil Company's extension discovery. Offsets to the north, west, south and southeast had been abandoned as failures. The direct east offset, however, produced.

Bay County: Way has been opened for more development in the Essexville pool, Hampton Township, following negotiation of a lease by the county board of supervisors to Johnson Oil Company on the 145-acre county-farm property. It was leased for $7500 and 25 percent royalty. The property joins the developed area on the south and the county's extended negotiations to lease had stymied development in that direction.

Michigan Lease Sale

The Lands Division of the Michigan Conservation Department will offer leases on about 25,000 acres of state-owned land at an auction in Lansing November 3.

Gaspe Test Promising

Continental Petroleums Ltd. found a saturated zone in its No. 2 well on the Gaspe Peninsula, Eastern Canada, in coarse, granular limestone (Devonian) at 2338 feet, during coring operations. Considerable gas and light gravity oil is entering the hole.

Oils to Be Made from Canadian Tar Sands

Operations of the new refinery at the Abasand plant at McMurray, Alberta, Canada, will be commenced within the next few weeks, according to G. R. Cottrelle, Toronto, oil controller for the dominion government, who recently visited the plant, accompanied by Dr. G. S. Hume, Calgary, geologist for the controller.

The new oil refinery will have a capacity of 500 barrels a day. It is being installed under direction of Universal Oil Products of Chicago. It will include a cracking unit, which is equipment not used hitherto in connection with the Athabaska oil sands.

Clean Product Necessary

"Refining of oil is not a problem," said Cottrelle, "but before the management can use the refinery they must have a clean product (extracted from bituminous sands) in order that the refinery can operate satisfactorily.

"Under the McClave process, the light ends obtained in refining, such as kerosine, have to be used in the separation, together with water and steam. These lighter ends are used as diluent. This diluent will go back into the refinery with the bitumen, but the water as well as the sand must be absolutely taken out before reaching the refinery.

"While it is true that when the refinery is installed they will have a complete operating unit, the problems are not yet nearly solved. It is evident that

extensive research work will have to be continued for some time to come.

"Further, no one knows what specimen products can be made. While everyone is satisfied that asphalt can be made, no one knows and will not know what process is to be used until research demonstrates what it is to be," said Cottrelle.

Pointing out that the Abasand company had been reorganized with a board of directors acceptable to federal government officials, Cottrelle said the reorganized company had become the instrument for government investigations and test.

"It must be emphasized that this is not a commercial undertaking. This is a test operation. The (separation) plant, though designed to handle 600 tons of oil sands a day, is after all only a plant for research. The research is being carried on with Universal Oil Products of Chicago as consultants."

Economy a Problem

"It has not been demonstrated whether the oil can be economically extracted from the sands. Neither is it known what specimen products can be made or at what cost. Until this is done and until a large deposit (of uniformly rich sand and a minimum of overburdens) is located, there is no foundation for a commercial operation."

Cottrelle declared the present company is endeavoring to establish data on which to judge: 1. If the McClave process is economically feasible; 2. To investigate other processes which may prove more economical or efficient than the McClave; 3. To establish data on which the feasibility of commercial operations of oil sand may be judged.

U. S. Exploratory Completions

GEORGIA WILDCAT

Echols County—Failure: Hunt Oil Co.'s Superior Pine Prod. Co. 1, ld lot 363 ld lot 13, abnd 3850 ft.

ILLINOIS WILDCATS

Bond County—Failure: C. E. Walters' Twidwell 1, se se nw 33-4n-3w, abnd 1027 ft.

Clinton County — Failure: Northern Ord's Payne 1, se se ne 3-2n-2w, abnd 756 ft.

Madison County—Failure: L. Alch's Gonterman 1, ne nw nw 21-4n-7w, abnd 2338 ft.

White County—Failures: W. P. Muller's Reding 1, se sw sw 5-4s-9e, abnd 3565 ft.

J. H. Gilliam et al's Pearson Est. 1, sw se se 14-4s-9e, abnd 3365 ft.

INDIANA WILDCATS

Perry County — Failure: Lena Larkin's Luecke 1, ne sw sw 31-5s-2w, abnd 715 ft.

Spencer County—Failure: Sun's Stallings 1, se se se 11-7s-6w, abnd 1506 ft.

KANSAS WILDCATS

Barton County—Failures: C. E. Ash's Donovan 1, nw nw se 36-17s-13w, Arb 3355 ft, abnd 3362 ft.

Deep Rock's Miller 1, ne nw sw 26-18s-2w, Miss 2930 ft, abnd 2996 ft.

Butler County—Failure: Adair & Morton's Hobson 1, sw sw ne 1-26s-6e, abnd 2850 ft.

Ellis County—Discovery: Sunray's Younger 1-B, se se ne 6-14s-17w, pot 75 bbls, 250 gals acid 3525-74 ft, td in Arb 3574 ft.

Franklin County—Failure: Sunray's Schnider 1, sec sw 32-15s-19e, How 3033 ft, Heeb 3312 ft, abnd 3388 ft.

Gove County—Failure: Texas Co.'s Fed'l Farm Mortgage 1, nw ne se 17-12s-30w, abnd 3898 ft.

Hodgeman County — Failure: Continental's Gleason 1, se ne nw 5-24s-21w, Arb 4971 ft, abnd 4980 ft.

Phillips County—Failure: Derby Oil et al's Beckman 1, swc se 36-3s-19w, Lans 3268 ft, Arb 3631 ft, abnd 3670 ft.

Sedgwick County—Failure: Paul Eckland's Stitt 1, sw se ne 21-27s-1w, Lans 2687 ft, abnd 2860 ft.

Stafford County—Failure: Plains Exploration Co.'s Brinkman 1, nwc ne 24-23s-12w, Arb 3756 ft, abnd 3784 ft.

KENTUCKY WILDCATS

Henderson County—Failure: Ohio's Hornbrook 1, 4-P-25, abnd 2342 ft.

Union County—Failure: Cochran & Ashland's Barker 1, 8-O-21, abnd 2343 ft.

NORTH LOUISIANA WILDCATS

Bossier Parish—Failure: O. F. Shaver's W. M. Brown Fee 1, 330 w of nec nw nw 8-21n-13w, abnd 1380 ft.

Grant Parish—Failure: H. H. Temple's N. W. Homer 2, c 38-6n-2w, n 5° 30 e 3475 w 1551 fr sec sect 38-6n-2w, abnd 2201 ft.

SOUTH LOUISIANA WILDCAT

Rapides Parish—Failure: Claude Morgan's Irene Wettermark 1, 1818 s 21° e fr m/wly/ cor sect 24 th 730 n 69° e to lcn in 24-5n-3w, Wilcox 3710 ft, sw, abnd in sh 7001 ft.

SOUTH LOUISIANA NEW PAY TEST

Acadia Parish—Branch Oil Discovery: Union Sulphur Co.'s J. P. Gueno Est. 3, start nec sect 51 go alg nel 6830 th sw at ra 600 to lcn

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MICHIGAN WILDCATS

Isabella County—Failures: C. W. Collin's Weidman 1, sw sw ne 27-14n-5w, Dundee lime 3641 ft, wtr 3705 ft, abnd 3715 ft.

Sohio's Cole 1, s½ se nw 34-14n-4w, abnd 1535 ft.

Kent County — Failure: Neil Wagenaar's Lawrence 1, se ne ne 30-10n-11w, Traverse 2376 ft, Dundee 2783 ft, so 2784 ft, abnd 2934 ft.

Mecosta County — Failures: Chapman Oil Co.'s Telzlaff 1, s½ nw sw 4-15n-9w, Marshall 1359 ft, Traverse 2931 ft, Dundee 3476 ft, Monroe 3560 ft, so 3601 ft, abnd 3675 ft.

Michigan Consolidated's State 1, nw se nw 13-15n-8w, Stray sand, abnd 1520 ft.

Tuscola County — Failure: Shell's Woidan 1, nw nw nw 16-13n-11e, Traverse 1882 ft, Monroe 2868 ft, so 2892 ft, so 3464 ft, Sylvania sand 3762 ft, abnd 4194 ft.

Van Buren County—Failure: W. H. Clock's Gannet 1, sw nw 19-3s-14w, abnd 1102 ft.

MICHIGAN NEW PAY TEST

Isabella County—Sherman Failure: Pure's Latham 2, nw nw se 33-15n-6w, otd 3693 ft, abnd 4994 ft.

MISSISSIPPI WILDCATS

Lauderdale County—Failure: Rogers Lacy's J. J. Shelburn 1, 660 fr nl 654 fr el nw ne 36-7n-17e, elev 285 ft, logged Eutaw 1850 ft, Tuscaloosa 2290 ft, Marine T. 2847 ft, Massive 3168 ft, abnd 4842 ft.

Wayne County—Failure: Southport Pet. Co.'s W. W. Evans 1, c ne ne 3-8n-6w, elev 300 ft, logged Wilcox 1180 ft, Midway 3226 ft, Chalk 3688 ft, Eutaw 4820 ft, Tuscaloosa 5890 ft, abnd 6418 ft.

MONTANA WILDCATS

Carbon County—Failure: R. C. Tarrant, McKay 2, c se nw 4-6s-18e, Roscoe district, Madison 4160 ft, sulphur wtr, abnd 4165 ft.

Chouteau County — Failure: Texas Co.'s Shepherd 1, ne sw sw 22-27n-3w, Ashmoor Block, abnd 2068½ ft.

NEBRASKA WILDCAT

Hitchcock County — Failure: Texas Co.'s Taunton 1, se nw nw 22-2n-35w, abnd 4663 ft.

NEW MEXICO WILDCAT

Lea County—Failure: Tide Water's State 1-N, c nw sw 19-22s-35e, elev 3557 ft, anhydrite 1887 ft, salt 2045-4080 ft, Yates 4360 ft, abnd 4500 ft.

OKLAHOMA WILDCATS

Cotton County—Failure: Carter's Parish 1, csw sw 1-2s-12w, Penn 2582 ft, abnd 2746 ft.

Lincoln County—Failure: E. S. Adkins' Nonnaker 1, sw sw ne 9-15n-6e, Syl 3875 ft, Vi 4052 ft, 1st Wx 4118 ft, 2nd Wx 4152 ft, abnd 4172 ft.

Pawnee County — Failure: Deep Rock's Dawes 1, sw nw se 32-22n-7e, Miss 2616 ft, Simp 2783 ft, Arb 2960 ft, abnd 3092 ft.

WEST TEXAS WILDCATS

Andrews County—Oil Discovery: Texas Co.'s University-Magnolia 1-L, c ne sw sec 41, blk 9, 1⅛ mi e of Emma field's 4300-ft San Andres prod, elev 3135 ft, anhydrite 1700 ft, Yates 2830 ft, brown lime 3800 ft, solid lime 3960 ft, flowed 541 bbls 2-in., 2000 gals acid Holt lime (Permian), perf 5310-30 ft, td 5520 ft, pb 5330 ft.

Howard County—Failure: Herman & Geo. Brown and J. C. Karcher's Caldwell 1-a, 990 ft snl 2250 ft wel T&P Ry. 32, blk 32, T-3-N, elev 2638 ft, jkd 2251 ft.

Pecos County — Failures: Humble's Dow Puckett 1, c sw nw T&P Ry. 150, blk 3, elev 3402 ft, abnd 3225 ft.

E. A. Ungren and A. J. Frazier's Jasper 1, 662 ft ewl 4620 ft nsl blk 104, Jasper CSL sur, elev 3220 ft, Trinity 490 ft, abnd 2792 ft.

WEST TEXAS DEEPENED OUTPOST

Winkler County—Keystone-Holt Extension: The Falcon Co.'s McCutcheon-Humble 5 (owdd), ne nw se PSL 15, blk B-2, 1½ miles se exten for Holt pay, otd 3600 ft, elev 2952 ft, San Angelo 4655 ft, flow 1033 bbls 41.5-gr, ¾-in, 500 gals acid Holt perf 4735-45 ft, td 4872 ft.

WEST CENTRAL TEXAS WILDCATS

Callahan County—Failure: Homer Beasley et al's Hatchett 1, sw nw nw D&DA sec 22, abnd 445 ft.

Jones County—Failures: Eltex, Ltd.'s Tucker 1, ne ne se T&P Ry. 13, blk 17, elev 1739 ft, abnd 2930 ft.

R. H. Roark et al's Blair 1, 1201 ft snl 780 ft ewl ne¼ T&P Ry. 16, blk 19, elev 1847 ft, abnd 3117 ft.

Mills County—Failures: Northern Ordnance's Bramblett 1, ne ne sw HT&B Ry, sec 34, elev 1593 ft, base Cretaceous 420 ft, Ellenberger 2993 ft, abnd 3248 ft.

Dr. Emil Ott et al's Yeager 1, 1767 ft nsl 3728 ft ewl sect 112, Caldwell CSL sur, elev 1267 ft, Marble Falls 1690 ft, Ellenberger 1959 ft, abnd 2000 ft.

Shackelford County—Failure: Shell's Lee 1, 2338 ft snl 332 ft ewl of sec 50, Wm. Woodward sur, elev 1425 ft, Bend 4156 ft, Mississippi 4585 ft, Ellenberger 4604 ft, abnd 4643 ft.

SOUTH CENTRAL TEXAS WILDCAT

Maverick County—Failure: Texas Gas and Utilities Co.'s Hal Mangum 1, 4512 fr wl 1637 ft sl sect 71 I&GN sur blk 7, abnd 5218 ft.

SOUTHWEST TEXAS WILDCATS

Duval County—Oil Discovery: J. W. Gorman's A. Herbst 2, 330 fr wl 1320 fr nl H&GN sur 9, 2200 w sw of Gorman's No. 1 dry hole on same lse, 640 acs, 9 mi e of Freer, elev 558 ft, sand 2831 ft, perf 10 shots 2832-34 ft, pump 43.2 bbls 23-gr oil, 60% wtr, td 2980 ft, pb td 2840 ft.

Duval County—Failure: J. W. Gorman-Bridewell Oil Co.'s M. V. Ruiz 1, 330 sw of nel 330 se of nwl 594 e of wl of sur 44, 330 sw of swl P. Garcia sur 1,346.5-ac lse, Cole 2280-96 ft, Chernosky 2680-2705 ft, abnd 3662 ft.

Webb County—Failure: Adams & Lyles' Prudencia de la Garza 1, 330 fr sl 990 fr wl 603.7-ac lse in sur 675, elev 850 ft, abnd 2415 ft.

LOWER TEXAS COAST WILDCATS

Bee County—Failure: Slick Oil Co.'s J. E. Copeland 1, 467 fr se&swl 332-ac tr, Obid Marshall sur A-235, 1½ mi se of S. Caesar on St. Germain farmout, Slick 6900 ft, abnd 7360 ft.

Lasalle County—Failure: Sohio Oil Co.'s Callahan Land & Pastoral Co. B-1, 100 fr el 900 fr wl W. F. Sparks sur 127, 3594 fr nearest el of Rch, abnd 6211 ft.

Live Oak County—Failures: Magnolia's C. K. Maley 1, Thos. B. Reese sur, 660 fr s&wl of lse, 7 mi ne of Oakville, abnd 7160 ft.

Moore Dev. Co.'s Clara Briam 2, start nec Dennis McGowen sur A-29, go sw alg nwl 9674 th se at ra 3300, 2 mi s of Oakville 660 fr nel 2000 fr nwl lse, pb&st 7088 ft, dotd 8006 ft.

LOWER TEXAS COAST OUTPOST

Dewitt County—Slick W. Extension: Transwestern Oil Co.'s Hettie Green 1, 330 fr nw&nel 150.8-ac lse, Louis Von Roeder sur, 2350 sw of Continental's Fed. Land Bnk of Houston 2, sand 7626 ft, perf 23 shots 7627-32 ft, 7638-43 ft, flow 221 bbls 35.3-gr, 5/32-in, td 7654 ft.

EAST TEXAS WILDCAT

Van Zandt County—Failure: Northern Ordnance's Shelton 1, 660 ft out sec 77.47-ac tr, Leander Smith sur, Martins Mill prospect, elev 530 ft, Pecan chalk 2755-2905 ft, Austin 3916-4290 ft, Woodbine 4755 ft, Georgetown 5658 ft, Paluxy 6662 ft, Glen Rose 6958 ft, massive anhydrite 8068-8270 ft, Pettit 8868 ft, Travis Peak 8962 ft, abnd 9200 ft.

NORTH TEXAS WILDCATS

Archer County—Failures: C. E. Morrison and Maguire Industries' McGregor 1, 150 ft snl 1200 ft wel lot 7, Brazos CSL sur, abnd 884 ft.

C. E. Morrison and Maguire Industries' McGregor 2, 125 ft snl 1215 ft ewl lot 7, Brazos CSL sur, abnd 1605 ft.

Cooke County—Failure: Texas Co.'s Bengfort 1, 1750 ft snl 660 ft ewl 120-ac lse, Timothy Jessup sur A-523, abnd 2759 ft.

Cooke County—Oil Discovery: S. D. Johnson et al's J. S. Gatewood 1, 1200 ft snl 3800 ft fr m/n/wl of MEP&P Ry. sur A-766, elev 953 ft, pump 157 bbls, Strawn 1568-81 ft.

Throckmorton County—Failure: Shell's Hill Allen 1, 2600 ft ewl 990 ft snl sect 288, BBB&C Ry. sur, A-908, elev 1369 ft, Bend 4462 ft, Marble Falls 4930 ft, Barnett 4940 ft, Chester (Miss.) 4972 ft, Chappell 5038 ft, Ellenburger 5242 ft, abnd 5470 ft.

Wilbarger County — Oil Discovery: Fain-McGaha et al's G. K. Martin 1, se se nw H&TC Ry. 5, blk 11, 3 mi w by n Fargo field, elev 1398 ft, Palo Pinto lime 4699 ft, flow 105 bbls 40-gr, natural 10-hr gauge via 20/64-in tub choke, perf 4747-4806 ft, td 4841 ft.

Young County—Failures: Moran & Sons' Campbell 1, 150 ft out swc TE&L sec 1463, abnd 952 ft.

G. A. Swink and J. L. Davis' Routon 1, 900 ft snl 1250 ft wel TE&L sec 265, abnd 755 ft.

NORTH TEXAS NEW PAY TEST

Archer County — Unnamed Shallow Pool Deep Failure: M. J. Delaney Co.-Guy Brown's Dempsey 8, 990 ft nsl 330 ft wel blk 10, lge 3, Denton CSL sur, elev 1020 ft, Ellenberger 5081 ft, abnd 5089 ft.

United States Wildcat Starts

ALABAMA

Choctaw County: W. O. Woodward, Tr.'s Mary Green 1, 3150 fr sl 660 fr wl 31-11n-4w, lcn.

ILLINOIS

Bond County: Northern Ordnance's Champion 1, ne ne sw 9-6n-3w, lcn.

Cumberland County: Keating Dr. Co.'s Gibson 1, nw sw ne 9-10n-7e, dr 334 ft.

Edwards County: Superior's Cowling 1, se sw ne 21-1s-14w, lcn.

Franklin County: S. D. Jarvis' Old Ben Coal et al 1, se ne se 29-5s-2e, dr.

Jefferson County: Texas Co.'s Inland Steel Co. 1, se sw sw 25-4s-1e, lcn.

Madison County: Fox & Fox's Cassen 1, ne nw se 14-5n-7w, lcn.

Richland County: Pure's Gray 1, se sw se 9-4n-9e, lcn.

Wayne County: Roy R. Powers' Freeman Hrs. 1, sw ne se 23-2n-8e, lcn.

Sinclair Wyoming's Milner 1, nw ne ne 31-1n-6e, lcn.

White County: Superior's Puckett 1, nw ne sw 23-3s-8e, lcn.

INDIANA

Crawford County: C. A. Roederer's Goldman 1, ne ne 18-3s-1w, lcn.

Posey County: Central States et al's Blackburn 1, sw sw nw 20-6s-13w, lcn.

Vanderberg County: Jarvis et al's Macke 1, sw sw sw 25-5s-11w, lcn.

Wabash County: Texas Co.'s Peebles 1, se sw sw 35-27n-6e, dr 447 ft.

KANSAS

Barber County: Lion Oil's Allen 1, nw nw ne 2-30s-14w, lcn.

Ellis County: H. E. Alexander's Schmeidder 1, nwc se 28-12s-17w, lcn.

Lane County: Skelly's James 1, nec 25-16s-29w, lcn.

Norton County: Sinclair Prairie's Reed 1, swc nw 12-4s-24w, lcn.

Pratt County: Wood River et al's Trelaine 1, swc 14-26s-13w, lcn.

Russell County: Maguire's Brundage 1, sw ne nw 10-12s-15w, rur.

Trego County: T. H. Allen et al's Monroe 1, swc 8-11s-21w, lcn.

KENTUCKY

Daviess County: Sinclair Prairie's Hancock 1, 6-O-28, dr 358 ft.

R. O. Gould's Pierce 1, 9-P-22, lcn.

Hopkins County: Hunt & T. F. Seitz's Whitfield 1-A, 1-K-25, dr.

Webster County: E. T. Wix's Duvan Coal Co. 1, 10-L-21, dr.

NORTH LOUISIANA

Caddo Parish: Phillips' Moneyham 1, c ne nw 5-18n-16w, lcn 6500-ft test.

Caldwell Parish: Atlantic's Tremont Lbr. Co. 1, 6-13n-2e, lcn 9500-ft test.

Claiborne Parish: Big West Drlg. Co.'s W. D. Allgood 1, sw 22-22n-5w, Bodcaw test, mlm.

Red River Parish: Magnolia's J. C. Pickett 1, c se se 11-14n-10w, lcn 6500-ft test.

Richland Parish: C. H. Murphey, Jr.'s, J. E. Holt 1, 21-17n-9e, lcn Tuscaloosa test.

Sabine Parish: J. L. Perry's Louisiana Long Leaf Lbr. Co. A-1, ne sw 29-8n-10w, dr 1410 ft.

West Carrol Parish: Arkansas Fuel Oil Co.'s Frances Briggs et al 1, 9-21n-11e, lcn 7000-ft test.

SOUTH LOUISIANA

Acadia Parish: Continental's Mrs. L. B. Thibodeaux 1, 330 fr nw&swl Irreg sect 73-7s-2e, Church Point area, lcn 10,500-ft test.

MICHIGAN

Isabella County: Gordon Oil Co.'s Schaffer 1, se se sw 21-15n-5w, lcn.

MISSISSIPPI

Greene County: Humble's Greene County School Land 1, 2500 fr nl 330 fr wl 16-3n-7w, lcn.

Hinds County: Carter Oil Co.'s W. G. Davis 1, c ne ne 15-3n-4w, lcn 9750-ft test.

Madison County: Gulf's R. H. Bradshaw 3, 660 s&w of nec se nw 29-3n-17n, lcn.

Pearl River County: Jesse McKee's R. Batson et al 1, 330 fr s&el sw 20-1s-15w, lcn.

Rankin County: Leonard Jones' Bullock 1, se se se 10-4n-2e, lcn.

MISSOURI

Caldwell County: E. Gotschall's Lane 1, sec ne 28-55n-39w, lcn.

MONTANA

Liberty County: Texas Co.'s Hanson 1, ne sw ne 21-33n-3e, West Utopia, dr 1550 ft.

Teton County: Texas Co.'s Burke 1, sw ne sw 11-25n-4w, Farmington prospect, dr 607 ft.

NEBRASKA

Hitchcock County: Texas Co.'s Egle 1, se se sw 29-4n-35w, Hamlet prospect, dr 2480 ft.

NEW MEXICO

Eddy County: Mark Whelan et al's George Riggs-Federal 1, ne nw ne 6-20s-30e, machine.

Lea County: Stanolind's State 1-O, c ne se 21-18s-34e, lcn 5500-ft San Andres test.

OKLAHOMA

Canadian County: Sinclair Prairie's Rott 1, nw se se 1-14n-9w, c&p.

Garfield County: Texas Co.'s School 1-F, sw sw sw 13-21n-4w, lcn.

Kingfisher County: Anderson-Prichard's Collett 1, se nw 25-15n-5w, mir.

Kiowa County: Pure's Henton 1, se nw nw 10-7n-17w, lcn.

Lincoln County: R. M. Tate's Sukovaty 1, sw sw se 15-14n-3e, lcn.

Love County: Sohio's Cartwright 1, se ne se 21-8s-2e, lcn.

Okfuskee County: Manahan Oil's Kennedy 1, se se 19-11n-8e, rur.

Pawnee County: Kerlyn Oil's Barrier 1-A, nw ne nw 22-23n-5e, dr 2985 ft.

Stephens County: A. A. Wisdom's Walters 1, se se sw 3-1s-8w, lcn.

E. M.Boring's Poe 1, se sw ne 7-3s-4w, lcn.

WEST TEXAS

Andrews County: Humble's E. M. Jones 1, c nw ne PSL 17, blk A-40, mile s of 10,929-ft failure, lcn 8500-ft Clear Fork test.

Ector County: Shell's Thomas Est. 1, c nw nw T&P Ry. 8, blk 45, T-1-S, lcn 8500-ft Devonian test.

Gaines County: Sinclair Prairie's W. L. Johnson 1, c ne se PSL 16, blk A-28, lcn 9000-ft Clear Fork test.

Howard County: Herman & Geo. Brown-J. C. Karcher's Caldwell 1-B, 890 ft snl 330 ft ewl ne T&P Ry. 32, blk 32, T-3-N, mim for 6000-ft rotary test, offset 2 junked tests.

Winkler County: Richardson & Bass' S. W. Sanford 1, c ne se PSL 25, blk B-2, lcn Ellenburger test.

WEST CENTRAL TEXAS

Fisher County: Grapeland Oil Co.'s C. F. Brooks 1, c ne sw H&TC Ry. 80, blk 1, lcn 6000-ft Ellenburger test.

Jones County: Eltex, Ltd's J. G. Dodge 1, 330 ft wel 2100 ft nsl A. Northington sur 247, lcn 2600-ft cable test.

T. D. Humphrey-Pete Burton's L. H. Culwell 1, nw nw sw sec 47, Deaf & Dumb Asylum Lands, lcn 3800-ft Canyon cable test.

Shackelford County: Hedrick Oil Co.-Jones & Stasney's Chloe A. Nail 1, 440 ft out swc E. T. Ry. sec 121, lcn 1400-ft cable test.

Taylor County: Geochemical Surveys et al's E. A. Click 1, 990 ft snl 300 ft wel labor 22, Lge 146, Grimes CSL sur, lcn 3000-ft cable test.

SOUTH CENTRAL TEXAS

Guadalupe County: Wiegand Bros.' Paul and Emma Baumert 3, 330 fr swly swl 1880 fr nwl 227-ac tr, Matthew Besore sur, 500 se No. 2, 2 mi s Kingsbury, ru.

SOUTHWEST TEXAS

Duval County: Texon Royalty Co. et al's D. C. Chapa 1, 933 sw of nel 467 nw of sel of 86.9-ac lse out of sh 7&8 in ptn of 494-ac Est of Josefa Gonzales, lcn 8500-ft test.

Starr County: Baldridge and King's F. B. Guerra Est. B-1, 467 fr nl 467 fr m/wly/el 875-ac lse 3107.3 w of el of Santa Cruz Gr, lcn 8000-ft test.

Zapata County: Bridwell Oil Co.'s Amada C. de Garcia et al 1, 467 fr nel 467 fr sel 2211-ac lse, Charco Redondo Gr, sh C, lcn 2000-ft test.

A. M. Lacey's Salome Martinez de Flores 1, 330 fr ne&nwl blk 4, 330 fr nel 962.7-ac lse, Blas. Maria Gr, 20 mi sw Mirando City, lcn 5000-ft test.

LOWER TEXAS COAST

Brooks County: Sun's Mary M. Lasater 2, 2074.6 e of wl 614-ac lse, HE&ST sur 349, 500 se of interior cor of lse, lcn 7000-ft test.

Dewitt County: Arkansas Fuel Oil Co.'s Ernest Richter 1, 1600 fr wl 300 fr nl 460-ac lse, G. W. Brooks sur, 4 mi sw Clinton, lcn 9000-ft test.

Fayette County: Continental's Louise Paulus et al 1, 330 fr n&el 135-ac tr 5, J. S. Menefee 1/3 Lge A-239, lcn 5700-ft test.

Jim Wells County: W. A. Richardson et al's Frances Clark A-1, 306 ac, Los Presenos Gr, 2½ mi se of Alice, elev 215 ft, lcn 5850 ft.

Kleberg County: Tide Water's E. W. House 1, 660 fr e&sl 160-ac lse, and blk 36, 2 mi ne Ricardo, lcn 8000-ft test.

San Patricio County: Mikton Oil Co.'s A. H. Misiran 1, 1330 fr el 1428 fr wl 2215 fr nl 200-ac lse, San Patricio de Hibernia Gr, lot 3, Farm blk 60, lcn 6700-ft test.

TEXAS GULF COAST

Harris County: Texas Co.'s Mrs. Madge Hopkins 1, 1750 fr wl 1980 fr sl 269.7-ac lse and R. H. Davis sur A-225, 3 mi ne of Addicks, lcn 7000-ft test.

Matagorda County: Atlantic's Denman-Kountze C-3, 880 fr wl 660 fr nl lot 12 Henry Parker sur, 150-ac tr, midway between No. 1 and No. 2 dry holes on C lse, lcn 6700-ft test.

Orange County: Pan American Prod. Co.'s Miller-Vidor Land Co. 1, directional hole, bottom hole lcn 990 fr ne&nwl John Peveto sur A-145, sur lcn 330 fr nwl 2600 fr nel sur, 187.6-ac lse, 3 mi w of Orange, mi.

NORTH TEXAS

Archer County: Frank Wood et al's L. F. Wilson 1-9, 330 ft out swc sec 9, ATNCL sur, lcn 4500-ft test.

A. B. Taylor et al's Mrs. J. R. Moore 1, 150 ft out nwc of n-60-ac sec 57, blk 4, Clark-Plumb sur, lcn 1100-ft rotary test.

White & Duncan et al's J. T. Richardson Est. 1-C, 939 ft wel 1890 ft snl blk 10, J. Scott sur A-374, testing.

Cooke County: Maguire Industries' A. Hoenig 1, 330 ft fr sel swl J. C. Morgan sur A-151, 2⅛ mi w Voth pool, lcn 3700-ft Ellenburger test.

Throckmorton County: Bridwell Oil Co.'s Mable Richards 1, 2595 ft nsl 3388 ft wel Andrew J. Morgan sur A-226, sd 1979-ft.

Wichita County: Jackson & Davenport's S. M. Wilson 1, 150 ft out swc S.P.Ry. sec 3, A-265, lcn 1850-ft rotary test.

TEXAS PANHANDLE

Donley County: Stanolind-Texas Co.'s W. J. Lewis 1, c sw ne D. & P. Ry. 81, blk E, lcn 7500-ft Ellenburger test.

WYOMING

Fremont County: Connor Tank Co.'s Unit 1, sw sw nw 26-41n-91w, Bridge Creek, lcn.

☆

GEORGE H. CARD, superintendent of production for Stanolind Oil & Gas Company in the Texas Panhandle, North and East Texas districts, has been promoted to assistant superintendent of the Fort Worth division. J. E. Wooten, who has been Kansas superintendent, will have charge of the Texas Panhandle, North Texas and Northwestern New Mexico with headquarters at Fort Worth, while I. L. Page of Longview becomes superintendent for East Texas.

The OIL WEEKLY'S TRADING POST

USED EQUIPMENT FORUM

CLASSIFIED ADS . . . EQUIPMENT . . . SERVICES . . . PERSONNEL

SITUATIONS WANTED

■ Gravity meter party available about November 16th. Address: Box 23, c/o The Oil Weekly, Houston, Texas.

AVAILABLE TO A PROGRESSIVE ORGANIZATION

Executive

20 years with major oil companies. Manager of Purchase and Store departments. Management engineering, field store auditing. Background of practical field work. For the past 2½ years have held responsible posts concerned with procurement for the Armed Forces.

Address:

Box 19, c/o The Oil Weekly, Houston, Texas

FOR SALE

■ About 28,000-acre block So. Ga. leases for sale. Send or come and investigate. Owners care box 364, Waycross, Ga.

■ FOR SALE: Complete gasoline rotary drilling rig, might consider shallow contracts. A. R. Lewis, Corsicana, Texas.

■ FOR SALE: One Ft. Worth "D" spudder located in Brown County, Texas; also, one complete string of cable tools in excellent condition. Tools may be inspected at Breckenridge, Texas. J. D. Sandefer, Jr., Breckenridge, Texas.

■ ROTARY DRILLING RIG for sale, complete with derrick, sub-structure, 3 boilers, 8" Emsco roller bearing draw works, 7,600' 4½" drill pipe in new condition, two 18" Wilson-Snyder pumps, etc. May be seen in operation in East Louisiana. Phone 3-7661, 601 Wall St., Shreveport, La.

FOR SALE

New and Reconditioned Iron & Steel

VALVES

Tested and Guaranteed

LARGE STOCK OF FITTINGS

APEX IRON & METAL CO.

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DRILL PIPE FOR SALE

9,000 feet 3½" O.D., Range 2, Drill Pipe with Hughes Acme Regular Tool Joints.
4,200 feet 3½" O.D., Range 1, Drill Pipe with Hughes Acme Regular Tool Joints.
6,600 feet 2⅞" O.D., Range 1, Drill Pipe with A.P.I. Full Hole Tool Joints.
Located in Houston.
Telephone J-2-1466 or T-6268, P. O. Box 1261, Houston, Texas.

HELP WANTED

■ WANTED: Experienced mechanical designing engineers by company established over fifty years. Increased demand for our products has created need for additional permanent engineering organization. Prefer graduate engineers with practical training in design and use of drilling and other machine products related to petroleum industry. Salary commensurate with experience and ability. State age, education, experience, record by consecutive dates for past ten years, references. No references will be contacted before personal interview. Address: Box 20, c/o The Oil Weekly, Houston, Texas.

■ WANTED: Salesmen for cable tool drilling equipment, preferably men with some drilling experience. Salary and commissions with traveling expenses paid. Permanent position. Give age, experience, education and references as well as history of employment for past ten years. No references will be contacted without your authority. Address: Box 21, c/o The Oil Weekly, Houston, Texas.

■ WANTED: Young Engineer for expanding gas department major oil company—chemical, mechanical or petroleum engineering training suitable—prefer some experience in oil or gas production. Fine opportunity for right person. Address: Box 24, c/o The Oil Weekly, Houston, Texas.

■ WANTED: Experienced production superintendent between 30-35 years old, familiar with gas, gas distillate, and oil wells, including dual completions and workovers. Prefer man with engineering training but not necessarily a degree. Address: Box 22, c/o The Oil Weekly, Houston, Texas.

NOTICES

Request for bids on OIL DRILLING RIGS WITHDRAWN

The request for bids covering three Government Owned Drilling Rigs, appearing in the October 23rd issue of this journal, is hereby withdrawn in-as-much as it is found necessary that the Government retain possession of this equipment.

Reconstruction Finance Corporation
Surplus War Property Division

Pacific Mutual Building
Los Angeles 14, California

BRONZOID
LENGTHENS LIFE OF EQUIPMENT

Only BRONZOID contains pre-treated lead which arrests crystalline growth in the resultant bronze.

The high compressive strength and low Brinell hardness of BRONZOID combine the best features of bronze and babbitt metal. That's why it is called "The Ultimate in Bearing Bronze."

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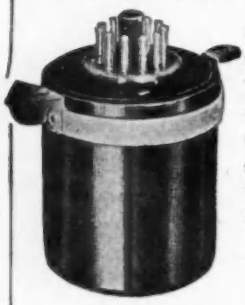

sealed against Sub tropical humidity—"Sextuplex shielding," improved uniformity, minimum size and weight, *plug-in terminal block.

* *Also available with terminal lugs.*

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Full line of Geophysical electronic supplies.

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LET ME SHOW YOU WHAT GOOD WATER CONDITIONING SERVICE REALLY IS!
Call JOHN FIELD-MAN ON YOUR NEXT WATER CONDITIONING JOB
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2211 PRESTON AVE. HOUSTON, TEXAS

Squeaks from the Bull Wheel

And He Didn't

Did you hear about the sailor who broke his arm trying to make a wave in the bathtub?

Mastering the Mashie

"Sure, golf is easy. All you do is smack the pill and then walk."

"Oh. Just like some auto rides I've been on."

False Front

A tricky jane, I'll tell the world
Is little Minnie Marters;
An inviting smile upon her lips
But mousetraps on her garters.

Sage Sayings

Not every plumber's daughter turns out to be a drip.

Although any man can have a wife, only the iceman has his pick.

Wall flowers with nice stems are worth cultivating.

Trial and Error

"Do you ever expect to find the perfect girl?"

"No, but it's fun making sure they're not."

Can't Be Done

Two rabbits sat watching a long and busy line on which thousands of tank parts were being made.

Finally one observed: "I'm not jealous, but they must've started out with more than two."

Compensation

There was a young lady from Maine,
Whose face was exceedingly plain;
But her dad had a cellar
They say was a heller,
So the boys came again and again.

A Woman's World

When a man is born his mother gets the compliments.

When he marries his bride gets the presents.

When he dies his wife gets the insurance.

Battle Royal

A mountaineer was haled into court on an assault charge. The state produced the weapons the defendant had allegedly used in the attack—a huge pole, a pair of shears, a dagger, a saw and a gun. But the defense countered by displaying the implements the defendant's adversary was said to have used—an axe, a shovel, a hoe and a pair of tongs.

The jury retired to ponder and in a little while returned with the following statement: "Jedge, we can't agree on no verdict, but by gosh, we'd a paid five dollars to a seen that fight!"

Poet's Nook

I think that I shall never see
A girl refuse a meal that's free;
A girl with hungry eyes not fixed
Upon the drink that's being mixed;
A girl who doesn't like to wear
A lot of junk to match her hair.
Girls are loved by guys like me—
For who the hell would kiss a tree?

Effective Compromise

"When you went to the seaside, did you keep your eyes open for a boy friend?"

"Certainly not. I closed one of them."

Strictly Truthful

"I'm going to be married and I want to buy a nightgown. What color is appropriate for a bride?"

"White is the preferred color if it is your first marriage, madam, and lavender if you have been married before."

"Well, you'd better give me some white ones with just a wee touch of lavender in them."

Swingshift Sue

There's lipstick on the drinking fount,
There's talcum on the bench,
There's cold cream on the surface plate,
Hand lotion on the wrench;
Evening in Paris scents the air,
That once held lube oil's smell,
I just picked up a bobby pin—
Believe me, war is hell!

Problem Solved

"Don't you know you can't sell insurance without a license?"

"I knew I wasn't selling any, but I didn't know the reason."

Nocturnal Music

Then there was the absentminded girl violinist who kissed her violin good night and took her bow to bed.

Nothing to Flee from

Said the flea as he bit the pastor on the leg: "Yum, yum! Divinity!"

☆

TED O. GROEBL of Big Spring, Texas, has acquired the assets of the Westex Oil Company. His brother and partner for 17 years, Albert P. Groebl, will devote his time to ranch interests in West Central Texas. Westex interests include production in the Snyder, O'Daniel, Jordan and Wasson fields.

FLOYD J. NICHOLSON, assistant land man for Shell Oil Company at Midland, Texas, has been transferred to Salisbury, Maryland, where he will be in charge of Shell's new land division on the Atlantic coast.

FRED C. SCOBEY, senior irrigation engineer, United States Department of Agriculture, Berkeley, California, addressed Engineers Club at Tulsa on "Unusual Flow Conditions in Water Conduit," illustrating the talk with colored slides.

BE SURE TO CHECK . . . .

Trading Post Section

ON PAGE 77 OF THIS ISSUE

Because of the scarcity of certain types of new equipment and the fact that some operators may have a surplus of some items and a serious shortage of others, this **Used Equipment Forum** is performing a valuable service to operators in locating needed used materials or disposing of surpluses that may be needed by others.

Notes for the Equipment Buyer and User

Rotary Type Oil Pump

JOHN S. BARNES CORPORATION

John S. Barnes Corporation, Rockford, Illinois, announces a low pressure rotary pump, designed for industrial applications that require pumping of all types of liquids having lubricating qualities. The pump is especially recommended for use as a lubricating booster pump for oil lines, a gasoline dispensing pump, and for oil pressure systems on automotive truck or tractor equipment.

Capacity ranges proportionately from one gallon at 600 revolutions per minute at 2400.

The patented spur gear tooth form is a feature of the pump which is said to eliminate excessive sliding and reduce slippage of the fluid to a minimum. Thus positive displacement of the fluid is assured despite variation in fluid viscosity or other factors.

A relief valve affords protection against excessive pressure.

Barnes Rotary Oil Pump

The vacuum created by two identical, precision cut, spur gears, which are the only moving parts, draws the fluid through the pump inlet. Fluid then passes between the teeth of the gears to the discharge side of the pump. Meshing of the gears forces the liquid into the discharge line. The driving gear is equipped with a free-floating type drive shaft of fine grained steel, with shear pin to minimize damage caused by foreign materials entering the pump housing.

Pump Catalog Available

Construction Machinery Company, Waterloo, Iowa, has published Bulletin 4405 on its general purpose self-priming centrifugal pumps, diaphragm pumps and high pressure single-stage centrifugal pumps, known as CMC Oilfield Pumps.

Tulsa Purchasing Agents Observe 25th Anniversary

George A. Renard, executive secretary of National Purchasing Agents, addressed purchasing agents of Tulsa on their 25th anniversary October 25 on the topic, "From One P.A. to Another."

The program was directed by W. H. Barclay, K. G. Manning and J. C. Nicholson.

Dresser Changes Firm Name; Capitalization Increased

Stockholders at a recent meeting voted to change their organization's name from Dresser Manufacturing Company to Dresser Industries, Inc., and to increase capitalization from 350,000 to 600,000 shares. The firm comprises a number of related companies producing equipment for oil, gas and water fields.

Effective November 1, Dresser will acquire the properties of International-Stacey in consideration for the issuance of 103,000 shares of Dresser stock to International-Stacey stockholders.

Tubing Bulletin Issued

Tube Reducing Corporation, Wallington, New Jersey, has published a bulletin for designing engineers and production-machine-shop executives. Information contained in the bulletin is pertinent to the production of metal parts of generally cylindrical form that can be made from tube stock, such as ferrules, bushings, spacers, sleeves, small pressure cylinders, bar and roller bearing race, hollow shafting, etc.

Basic information is included about the principal methods used to size hot-rolled tubing.

Pittsburgh Equitable Company Makes Personnel Changes

C. C. Moore

F. G. Swaffield

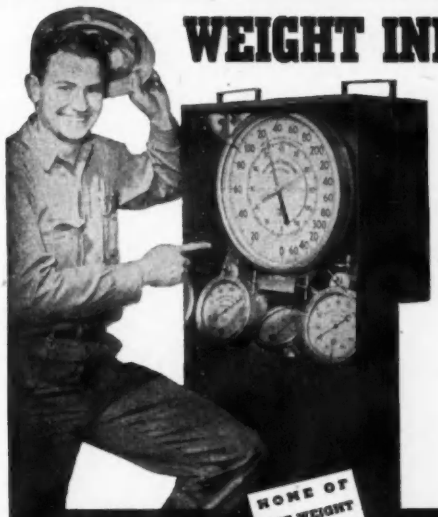
J. E. Brown

Pittsburgh Equitable Meter Company-Merco Nordstrom Valve Company, Pittsburgh, Pennsylvania, announces the following changes in personnel:

With the consolidation of the Columbia, South Carolina, and Atlanta, Georgia, offces, C. C. Moore became manager of the Atlanta office, and will direct sales in Florida, Georgia, Alabama, Mississippi, Tennessee, North and South Carolina, Virginia and most of Kentucky.

F. G. Swaffield, former manager of the Columbia, South Carolina, office, is retiring from active service, after 40 years with the sales force.

J. E. Brown has been promoted to assistant to the general sales manager of the company, and will have headquarters in Pittsburgh. He has been with the company since 1906, and has served in various executive sales capacities in several districts.



WEIGHT INDICATOR POINTS

READABILITY—PORTABILITY
RUGGEDNESS
THE *UNITIZED* HAS THEM ALL

The Martin-Decker Unitized is the pace-setter in portable mud pump gauges.

READABLE—The gauge hand revolves before stationary dials, permits easy reading of pressure at a glance from any distance.

RUGGED—Sturdy conventional construction permits ready repairs in the field by any good mechanic—if ever necessary.

PORTABLE—Completely self-contained, with oil-sealed gauge, diaphragm unit, pulsation damper and vernier mechanism built right into the heavy brass case. Quick action coupling permits fast installation.

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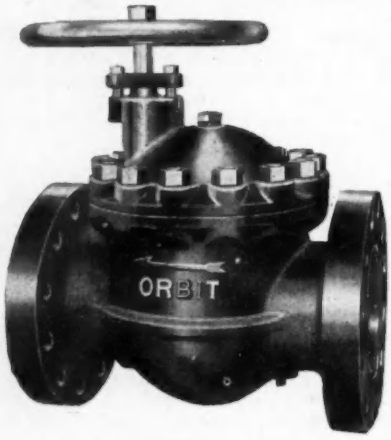
ORBIT

DRILLING VALVES ARE QUICK OPENING

Only 2½ to 5 turns are required to fully open or close the ORBIT DRILLING VALVE. The seats are protected against damage from drilling tools and wire lines.



Orbit Flanged End Drilling Valve

Orbit Drilling Valves are available in both full opening and nominal opening sizes. With flanged or screwed ends.

See 1944 Composite Catalog

ORBIT VALVES

OIL WELL IMPROVEMENTS COMPANY

TULSA, OKLAHOMA

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Phone Fairfax 0057
Warehouse 1121 Rothwell, Sect. 15, Houston

Earl F. Warren, Phone 919-W, Alice, Texas

Rex E. Galloup, Phone 6436, Lubbock, Texas

JOHN J. LARKIN, 63, president of the Larkin Packer Company, died October 23. at St. Louis, Missouri, after a brief illness. Larkin founded his company in 1905 at Bartlesville, Indian Territory, when development of the Mid-Continent fields started. He moved the general offices to St. Louis, Missouri, in 1920. He is survived by his widow and two sons.

JOHN G. PUNDT of Dallas has been appointed general superintendent of the C. & S. Oil Company's operations in the Funk pool, West Texas, and will reside at San Angelo, where the company has established a district office.

EDWARD B. WHITE, western sales manager of Eutectic Welding Alloys Company, addressed American Society of Mechanical Engineers at Tulsa, on: "Theory of Soldering, Brazing and Low Temperature Welding," illustrating the talk with slides showing labor-saving devices.

HOWARD S. KUNSMAN, former Oklahoma district geologist for Barnsdall Oil Company, is practicing consulting geology in the offices of Bale & Kirkpatrick, Oklahoma City, and at his residence in Tulsa, at 1011 East 36th Street.

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COMPOSITE CATALOG

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Standco
NO-SMOKE
STANDCO BRAKE LINING
for the easiest brake known. It "feeds off" evenly. Standco never scores brake rims. See page 2808 Composite Catalog.
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HOUSTON